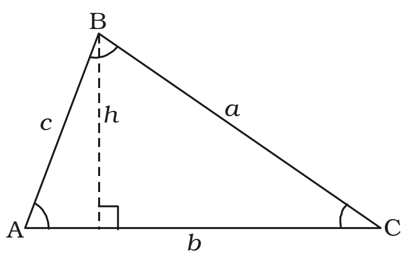
20 MENSURATION

PERIMETER & AREA (2-DIMENSIONAL PLANE FIGURE)

The area of any figure is the planar space occupied by it or the amount of surface (space) enclosed within its boundary lines. It is measured by the number of square metres or square centimetres or square inches (or some other units of square measure) that it contains. Hence, its units are accordingly square metre, square centimetre, square inch, square foot, etc.

Perimeter : Perimeter of a geometrical figure is the total length of the sides enclosing the figure or the total length of its boundary.



Triangle : A triangle is a plane figure bounded by three sides.

It includes three angles. It is denoted by the symbol Δ.

General Convention : (*i*) Nomenclature of vertices or sides are usually done in clock-wise manner.

(*ii*) The side opposite to the vertex *A* is '*a*', the side opposite to the vertex *B* is '*b*' and so on.

(*iii*) Angle *A* (or angle *BAC*) is denoted by $\angle A$ (or $\angle ABC$) and is the angle at vertex *A* enclosed by sides *b* and *c*. It is opposite to side *a*. Similarly, we can write $\angle B$ and $\angle C$. The sum of the three interior angles of a triangle is equal to 180°. Thus, $\angle A + \angle B + \angle C = 180°$

Important Formula based on triangles

Rule 1 : Area of a triangle = $\frac{1}{2}$ base × height

(a) $A = \frac{1}{2}bh$.

(b) $b = \frac{2A}{h} = \sqrt{2A\left(\frac{b}{h}\right)}$

(c) $h = \frac{2A}{b} = \sqrt{\left(\frac{2A}{b/h}\right)}$

Rule 2 : $A = \sqrt{S(S-a)(S-b)(S-c)}$

Rule 3 : $P = a + b + c = 2S$

Rule 4 : Right angled triangle : A

$= \frac{1}{2}$ base × perpendicular

Rule 5 : Isosceles triangle : $A = \frac{1}{4}\ b\sqrt{(4a^2 - b^2)}$

where a = equal side

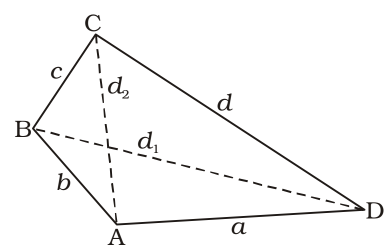
Rule 6 : Equilateral triangle : h

$= \frac{\sqrt{3}}{2}a$; $A = \frac{\sqrt{3}}{4}a^2 = 0.433\ a^2$

Rule 7 : Right isosceles triangle A

$= \frac{1}{2}b^2 = \frac{1}{4}$ (hypotenuse)^2

Quadrilateral : It is a plane figure bounded by four sides. It has four angles included in it. The sum of these four angles is 360°.



So, $\angle A + \angle B + \angle C + \angle D = 360°$

Important Formulae based on various quadrilaterals

Rule 8 :

Quadrilateral :

(a) $P = a + b + c + d$

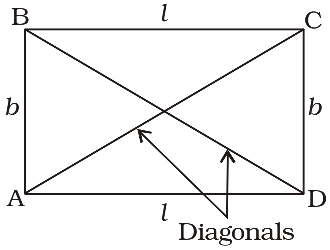
$S = \frac{P}{2} = \frac{a+b+c+d}{2}$

(b) $A = \sqrt{S(S-a)(S-b)(S-c)(S-d)}$

(c) $A = \sqrt{4(d_1 d_2)^2 - (b^2 + d^2 - a^2 - c^2)}$ where d_1 and d_2 are diagonals.

Rule 9 :

Rectangle : A geometrical figure having opposite sides are equal and parallel. Also the angle between adjacent sides is 90°.



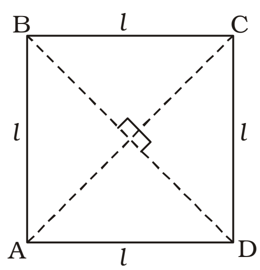
(a) $A = lb,\ l = \dfrac{A}{b},\ b = \dfrac{A}{l}$

(b) $P = 2(l + b) = 2b\left(\dfrac{l}{b}+1\right) = 2l\left(1+\dfrac{b}{l}\right)$

(c) If $\dfrac{l}{b} = n$, then $A = nb^2 : b = \sqrt{\dfrac{A}{n}}$ and $l = \sqrt{nA}$

Rule 10 :

Square : A geometrical figure having all sides equal and the angle between adjacent sides is 90°.



(a) $A = a^2 = \dfrac{(\text{diagonal})^2}{2}$

(b) $P = 4a$

(c) $P = 4\sqrt{A}$

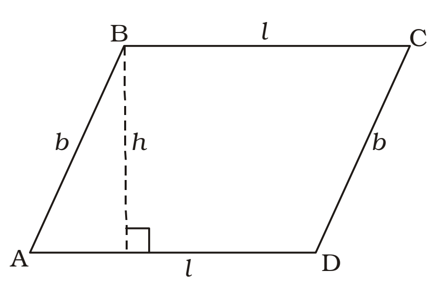
(d) $A = \dfrac{P^2}{16}$

Rule 11 :

Parallelogram : A geometrical figure having opposite sides are equal and parallel.

$A = lh$

$P = 2(l + b)$



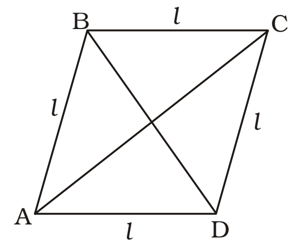
Rule 12 :

Rhombus : A geometrical figure having all sides equal.

$A = \dfrac{1}{2}(d_1 \times d_2)$

$P = 4l$

Side, $l = \dfrac{1}{2}\sqrt{d_1^2 + d_2^2}$

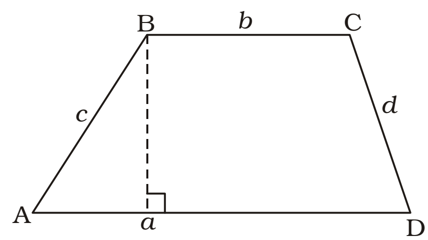


Rule 13 :

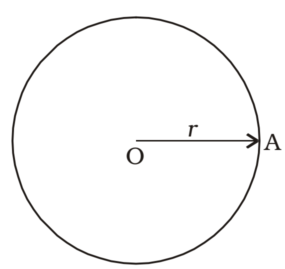
Trapezium : A geomatrical figure having any pair of sides are parallel and unequal

$A = \dfrac{1}{2}(a + b)h$

$P = a + b + c + d$



Circle : A circle is the locus of points such that their distance from a fixed point is always equal. The fixed point (O) is called the centre of the circle and the distance (r = OA) between the fixed point (O) and the moving point (A) is called the radius of the circle.



Rule 14:

Circle :

$D = 2r$ $\qquad A = \pi r^2 = \dfrac{\pi D^2}{4}$

$r = \sqrt{\frac{A}{\pi}}$ $\qquad$ $P = 2\pi r = \pi D$

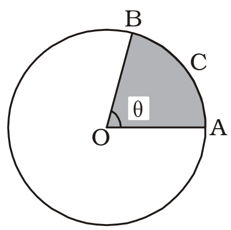
$A = \frac{p^2}{4\pi}$ $\qquad$ $P = \sqrt{4\pi A}$

Semi Circle :

$A = \frac{\pi r^2}{2}$ $\qquad$ $P = \pi r + 2r = \frac{36}{7} r$

Rule 15 :
Length of arc

$$= \left(\frac{\theta^\circ}{360^\circ}\right) \times 2\pi r = \theta \text{ (in radian)} \times r$$



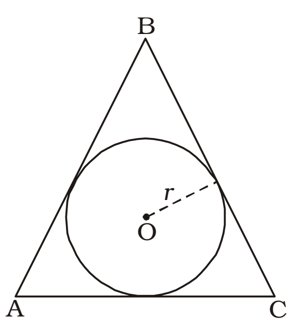
Rule 16 :

$$\theta \text{ (in degree)} = \left(\frac{\theta^\circ}{180^\circ}\right) \pi \text{ radian}$$

Rule 17:

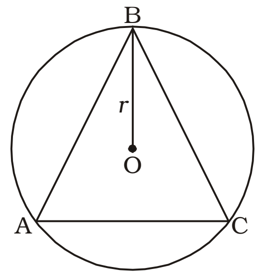
$$\text{Area of sector} = \left(\frac{\theta^\circ}{360^\circ}\right) \pi r^2 = \frac{r}{2} \text{ (Length of arc)}$$

Incircle or Inscribed Circle: It is the circle in side the polygon whose all the sides are tangent to the circle.

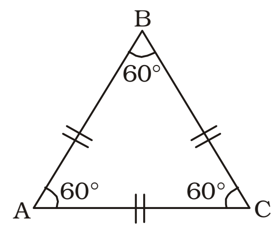


For an equilateral triangle of side 'a'. radius of the inscribed circle = $\frac{a}{2\sqrt{3}}$. This is called in-radius.

Circumcircle : It is the circle whose circumference touches all the vertices of the polygon.



Equilateral Triangle: It is a triangle whose all the three sides are equal. It can be proved that its all three angles are also equal, each being 60°.



Rule 18:
For an equilateral triangle :

(a) In-radius = $\frac{a}{2\sqrt{3}}$; Area of incircle = $\frac{\pi}{12} a^2$

(b) Circum radius = $\frac{a}{\sqrt{3}}$;

Area of circum circle = $\frac{\pi}{3} a^2$

Rule 19:
For a rectangular room (or box)
Area of the floor = lb
Area of 4 walls (or faces) = $2h\,(l + b)$
Area of 4 walls and floor = $2h\,(l + b) + lb$
Area of 4 walls, floor and roof = $2[h(l + b) + lb]$

Rule 20:
Area of a regular polygon

$= \frac{1}{2} \times$ (number of sides) $\times$ (radius of inscribed circle)

Rule 21:

Area of a regular hexagon = $\frac{3\sqrt{3}}{2}(\text{side})^2$

$= 2.598\ (\text{side})^2$

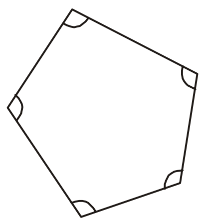
Rule 22:

Area of a regular octagon = $2\left(\sqrt{2}+1\right)(\text{side})^2$

$= 4.828\ (\text{side})^2$

Regular Polygon	No. of sides	Area (S = side of the polygon)
Triangle (Equilateral)	3	$0.433\ S^2$
Square	4	$1.000\ S^2$
Pentagon	5	$1.720\ S^2$
Hexagon	6	$2.598\ S^2$
Septagon	7	$3.634\ S^2$
Octagon	8	$4.828\ S^2$
Nonagon	9	$6.182\ S^2$
Decagon	10	$7.694\ S^2$

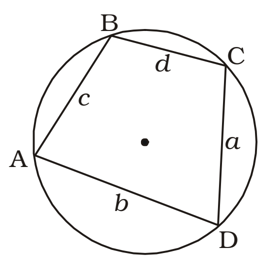
For a regular polygon of n equal sides, its vertex angle θ is given by



$$\theta = \frac{(n-2)\times 180}{n}$$

Rule 23:

Cyclic Quadrilateral: It is a quadrilateral whose vertices lie on the circumference of the circle.



$$A = \sqrt{S(S-a)(S-b)(S-c)(S-d)}$$

where, $S = \frac{a+b+c+d}{2}$

and $\angle A + \angle B + \angle C + \angle D = 2 \times 180°$

or, $\angle A + \angle B + \angle C + \angle D = 360°$

Important rules

Rule 1:

Cost of carpeting the floor

$$= \text{Rate of carpet per metre} \times \frac{\text{Area of the floor}}{\text{Width of carpet}}$$

Rule 2:

Least number of equal square tiles required for flooring

$$= \frac{\text{Length} \times \text{Breadth of the room}}{\text{HCF of length and breadth of the room}}$$

Rule 3:

(a) When a path of width 'w' is constructed around a rectangular garden of length 'L' and breadth 'B'.

Area of the path = $2w\ [L + B \pm 2w]$

Sign convention: (+) when path surrounds the garden/park on its outside

Rule 4:

When the paths, each of width 'w' are constructed on the outside as well as inside the garden.

Area of the path = $4w[L + B]$

Rule 5:

When cross paths each of width 'w' is constructed across the field,

Total area of the path = $w(L + B - w)$

Uncovered area of the field = $(L - w)\ (B - w)$

Rule 6:

Area of the path of width w around square of side 'S' on its outside = $4w\ (S + w)$ ...(A)

Area of the path of width w around square of side 'S' on its inside = $4w\ (S - w)$ ...(B)

Total area of the path of width w around square of side 'S' both on its outside and inside = $8\ Sw$ ...(C)

Total area of paths each of width w crossing each other at right angle inside square of side 'S' = $w(2S - w)$ ...(D)

Area of remaining portion of square of side 'S' in which two paths each of width w cross at right angle inside it = $(S - w)^2$ ...(E)

Rule 7:

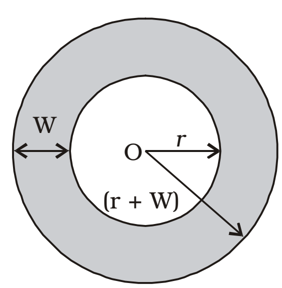
Distance covered by a moving wheel of radius 'r' (or diameter D)

= $2\pi r$ × No. of revolutions = πD × No. of revolutions

Rule 8:

A circular garden of radius 'r' has a path of width 'w' around it. Then Area of the path = $\pi w\ (2r \pm w)$

Sign convention: (+) when path is outside the garden (–) when path is inside the garden.



Rule 9:

A circular garden of radius r has paths around it, outside as well as inside, each of width 'w'. Then

Total area of the path = $4\pi\ wr$

Rule 10:

When Length and breadth of a rectangle are changed by x% and y% respectively, the net% change in its area

$$= \left[x + y + \frac{xy}{100}\right]\% = \left(\frac{-x^2}{100}\right)\% \text{ when } x = -y$$

Sign convention: + for increase, – for decrease

Note: Put '0' for no change.

Rule 11:

If there is no change in area, then

$$y = \left(\frac{-100x}{100+x}\right)\% \text{ and } x = \left(\frac{-100y}{100+y}\right)\%$$

Rule 12:

When each of the sides of a triangle or any polygon including square, rectangle etc. or radius of a circle is increased by x%, then

$$\% \text{ change in area} = x\left(2 + \frac{x}{100}\right)\%$$

% change in perimeter = x%

In case of quadrilateral,

% change in diagonal = x%

Sign convention : + for increase, – for decrease.

SURFACE AREAS AND VOLUMES (3-DIMENSOINAL FIGURE)

Every real object occupies some space. It is usually specified by its three dimensions—length, breadth and depth (or height or thickness). The object may be solid or hollow. In case of circular, cylindrical and spherical object, the specifying dimensions change to radius, angle etc. The amount of space occupied by the object is called its **volume**. In case of hollow objects such as tank, bucket, bottle etc, the amount of liquid required to fill it is called its **capacity** or volume of the object. Its unit of measurement is m^3, cm^3, $(inches)^3$ etc. The area of the surfaces (plane/curved) of the object is called its surface area. It can be outer/external surface area or inner/internal surface area. If it is not clearly specified, surface area means outer surface area.

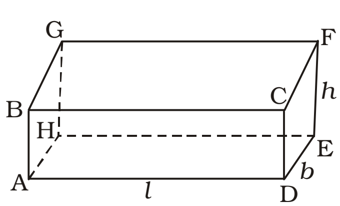
A 2-dimensional figure is a special case or a limiting case of a 3-dimensional object in which its third dimension i.e., depth (or thickness) is negligible in comparison to its other two dimensions i.e., length and breadth.

We illustrate below some important 3-dimensional objects and also write formulae associated with them,

In general we will use l = length, b = breadth, h = height, w = width, r = radius, D = diameter, P = perimeter, A = area, V = volume.

Cuboid

It is made up of 6 rectangular faces. All sides/edges/faces meet at right angle. Pair of opposite faces are equal.



Rule 1:

(a) Volume : V = lbh cubic units

(b) Total Surface Area : A = 2 (lb + bh + lh) square units

(c) Face diagonals : AC = BD = GE = FH = $\sqrt{l^2 + h^2}$

(d) DF = CE = AG = BH = $\sqrt{b^2 + h^2}$

(e) AE = DH = BF = CG = $\sqrt{l^2 + b^2}$

(f) Body diagonal or diagonal of the cuboid :

AF = BE = DG = CH = $\sqrt{l^2 + b^2 + h^2}$

Rule 2:

(a) Volume = a^3 cubic units

(b) Total Surface Area = $6a^2$ sq. units

(c) Volume = $\left(\sqrt{\frac{\text{Surface Area}}{6}}\right)^3$ or, $\left[\sqrt{\frac{S}{6}}\right]^3$

(d) Face diagonal = $\sqrt{2}\, a$

(c) Body diagonal or Diagonal of the cube = $\sqrt{3}$ a

Rule 3:

(a) Volume = $\pi r^2 h$ cubic units

(b) Area of the curved surface = $2\pi rh$ sq. units

(c) Area of the base = Area of the top = πr^2 sq. units

(d) Total surface area = $(2\pi rh + 2\pi r^2)$sq. units
= $2\pi r\,(h + r)$ sq. units

Rule 4:

(a) Volume = $\frac{4}{3}\pi r^3$ cu. units

(b) Surface area = $4\pi r^2$ sq. units

(c) $\frac{A^3}{V^2} = 36\pi$

Rule 5:

(a) Volume = $\frac{2}{3}\pi r^3$ cu. units

(b) Area of the curved surface = $2\pi r^2$ sq. units

(c) Total surface Area = $3\pi r^2$ sq. units

Rule 6:

l = slant height, h = height, r = radius

(a) $l = \sqrt{r^2 + h^2}$

(b) V = $\frac{1}{3}\pi r^2 h$ cu. units

(c) Area of the curved surface = πrl

= $\pi r\sqrt{r^2+h^2}$ sp. units

(d) Area of the base = πr^2 sq. units

(e) Total surface area of the cone = $(\pi rl + \pi r^2) = \pi r(l + r)$ sq. units

Rule 7:

(a) s = $\sqrt{h^2+(R-r)^2}$

(b) V = $\frac{\pi h}{3}(R^2 + r^2 + Rr)$ cu. units.

(c) Area of the curved or slant surface = $\pi(R + r)\,s$ sq. units

(d) Total surface area of the frustum = $\pi[(R^2 + r^2) + s(R + r)]$ sq. units

Rule 8:

Volume of material of a cylindrical tube,

(a) V = $\pi L(r_\circ^2 - r_i^2)$

(b) V = $\pi L\,(r_\circ + r_i)\,(r_\circ - r)$

(c) V = $\pi L\,(r_\circ + r_t)$

(d) V = $\pi L\,(2r_i + t)t$

(e) V = $\pi L\,(2r_\circ - t)t$

Rule 1:

(a) When rectangular sheet is rolled along its length (L) to form a cylinder of height/length W, then the volume of the cylinder so formed is given by, V = $\frac{WL^2}{4\pi}$

(b) When it is rolled along its width (W). V = $\frac{LW^2}{4\pi}$

Rule 2:

A well of radius r_i is dug to a depth 'h'. The earth dug out is spread uniformly around the well to form an embankment of width 'w'. Then the height of the embankment so formed is given by, H = $\frac{r_i^2 h}{(2r_i+t)t}$

Rule 3:

(a) If the length, breadth and height of a cuboid (or cube) are changed by x%, y% and z% respectively, then the % change in its volume

$$= \left[x+y+z+\frac{xy+yz+zx}{100}+\frac{xyz}{(100)^2}\right]\%$$

Sign convention : (+ve) for increase, (–ve) for decrease

(b) When $x = y = z$ i.e; % change is equal in all the sides, then the % change

$$= \left[3x+\frac{3x^2}{(100)}+\frac{x^3}{(100)^2}\right]\% = \left[\left(1+\frac{x}{100}\right)^3-1\right]\times 100\%$$

Note: This is applicable for sphere, hemisphere, cube, cylinder and cone too.

Rule 4:

Cylinder In case of Cylinder

(a) If x : % change in radius

y : % change in height/length

Then, % change in volume

$$= \left[2x+y+\frac{x^2+2xy}{100}+\frac{x^2y}{(100)^3}\right]\%$$

Note: This can also be obtained from formula (12) by putting $x = z$

(b) When $y = 0$, % change in volume = $\left[2x+\frac{x^2}{100}\right]\%$

(c) When $x = 0$, % change in volume = $y\%$

Note: These are also applicable to cones.

Rule 5:

(Ratio based)

Sphere, Hemisphere, Cube (side : r)

(i) (a) $V \propto r^3$ (b) $A \propto r^2$ (c) $V^2 \propto A^3$

or, $V \propto (A)^{3/2}$

or, $A \propto (V)^{2/3}$

Cylinder $V \propto r^2h$, $A \propto rh$

(ii) When h : constant :

(a) $V \propto r^2$ (b) $A \propto r$ (c) $V \propto A^2$

(iii) When r : constant :

(a) $V \propto h$ (b) $A \propto h$ (c) $V \propto A$

(iv) When V : constant :

(a) $h \propto \frac{1}{r^2}$ (b) $A \propto (rh)$

$r \propto \frac{1}{\sqrt{h}}$ $A \propto \frac{1}{r}$

$A \propto \frac{1}{h}$

(v) When A : constant :

(a) $r \propto \frac{1}{h}$ (b) $V \propto r$, $v \propto \frac{1}{h}$

Cones

V, A, r, h ratios remain same as for cylinders.

Further,

(vi) $A \propto$ slant height (l)

$l \propto \frac{1}{r}$, $r \propto \frac{1}{l}$

Rule 6:

(a) If a sphere of radius R is melted to form smaller spheres of radius 'r'. No. of smaller spheres formed $= \left(\frac{R}{r}\right)^3$

(b) If n small spheres of radius 'r' are melted to form a big sphere of radius 'R', then R = $r\sqrt[3]{n}$

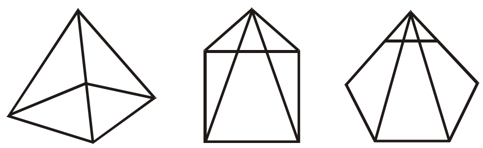
PRISM AND PYRAMID

Importance : Question based on Prism & Pyramid are seldom asked, however these questions are very easy to be solved.

Scope of questions : Questions are related to surface area, volume, length of cloth for wrapping/covering, or based on spherical shape.

Way to success : For these shapes formulae and methods for getting areas and volumes are very useful.

Pyramid :



Rule 1. Volume = $\frac{1}{3}$ × (base area) × height

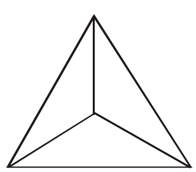
Rule 2. Lateral surface (Triangular) area

= $\frac{1}{2}$ × (Perimeter of base) × (lateral height).

Rule 3. Lateral height = $\sqrt{\left(\frac{a}{2}\right)^2 + h^2}$

Where base of rectangle/square/triangle = a and h is the height.

Tetrahedron : A pyramid with regular triangular base is tetrahedron. It is bounded by four regular triangular faces.



Rule 4. ∴ Area of (all three) lateral faces

$= \frac{3\sqrt{3}}{4} \times (\text{side})^2$

Rule 5. Total surface area (of all four faces)

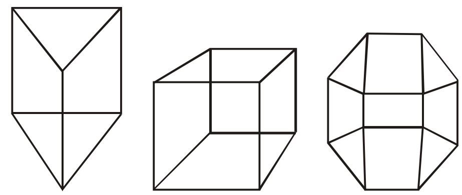
$= \frac{4\sqrt{3}}{4} \times (\text{side})^2 = \sqrt{3} \times (\text{side})^2$

Rule 6. Height = $\frac{\sqrt{2}}{\sqrt{3}} \times (\text{side})$

Rule 7. Volume = $\frac{\sqrt{2}}{12} \times (\text{side})^3$

Rule 8.

Prism

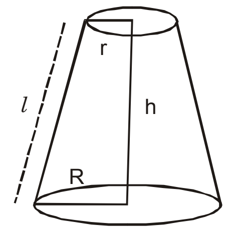


∴ Volume =(base area) × height

Lateral surface area = (perimeter of base) × slant height.

Total surface area = (Perimeter of base × height) + 2 × area of base

Frustrum :



Rule 9.

Volume = $\frac{1}{3}\pi h\left(R^2 + r^2 + Rr\right)$ or $\frac{1}{3}\pi h\left[(R+r)^2 - Rr\right]$

Rule 10. Lateral height (l) = $\sqrt{h^2 + (R-r)^2}$

Rule 11. Area of lateral surface = $\pi(R + r)l$

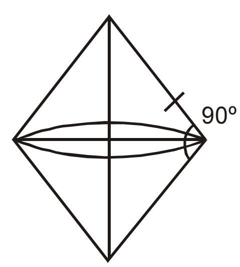
Rule 12. Area of total surface

$= \pi\{(R + r)l + R^2 + r^2\}$

Rule 13. Total surface area of bucket

$= \pi\{(R + r)l + r^2\}$

Rule 14. When a figure is made moving a right angle Δ with the hypotenuse around.



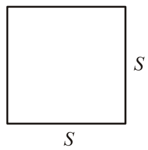
Volume = $\frac{1}{3}\pi r^2 \times \text{hypotenuse}$

where r = $\frac{\text{base} \times \text{perpendicular}}{\text{hypotenuse}}$

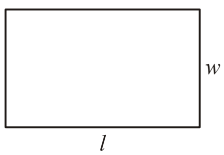
2D GEOMETRY FORMULAE

SQUARE

s = side Area: A = s^2 Perimeter: P = $4s$



RECTANGLE

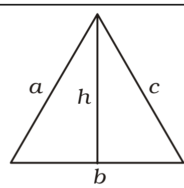


l = length, w = width
Area : $A = lw$
Perimeter : $P = 2l + 2w$

TRIANGLE
b = base, h = height

Area : $A = \frac{1}{2}bh$

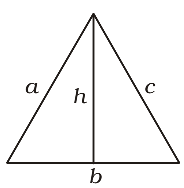
Perimeter : $P = a + b + c$



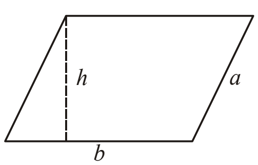
EQUILATERAL TRIANGLE
s = side

Height: $h = \frac{\sqrt{3}}{2}s$

Area : $A = \frac{\sqrt{3}}{4}s^2$

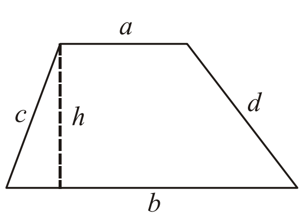


PARALLELOGRAM



b = base, h = height, a = side
Area : $A = bh$
Perimeter : $P = 2a + 2b$

TRAPEZIUM

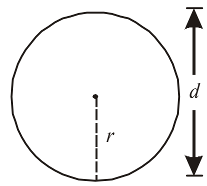


a, b = bases; h = height; c, d = sides

Area: $A = \frac{1}{2}(a + b)\,h$

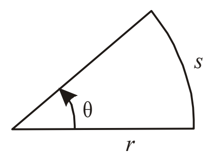
Perimeter : $P = a + b + c + d$

CIRCLE



r = radius, d = diameter
Diameter : $d = 2r$
Area: $A = \pi r^2$
Circumference : $C = 2\pi r = \pi d$

SECTOR OF CIRCLE



r = radius, θ = angle in radians

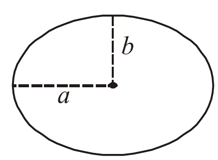
Area : A = $\frac{1}{2}\pi r^2$

Arc Length : $s = \theta r$

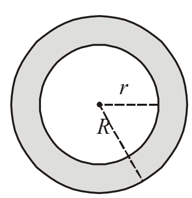
ELLIPSE

a = semimajor axis
b = semiminor axis
Area : $A = \pi ab$
Circumference :

$C \approx \pi\left(3(a+b) - \sqrt{(a+3b)(b+3a)}\right)$



ANNULUS

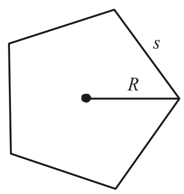


r = inner radius, R = outer radius

Average Radius : $\rho = \frac{1}{2}(r + R)$

Width : $w = R - r$
Area : A = $\pi(R^2 - r^2)$ or A = $2\,p\pi\rho w$

REGULAR POLYGON



s = side length, n = number of sides

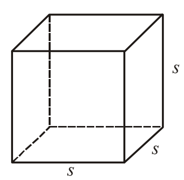
Circumradius: $R = \frac{1}{2} s \cos\left(\frac{\pi}{n}\right)$

Area : $A = \frac{1}{4} n s^2 \cot\left(\frac{\pi}{n}\right)$

or $A = \frac{1}{2} n R^2 \sin\left(\frac{2\pi}{n}\right)$

3D GEOMETRY FORMULAE

CUBE

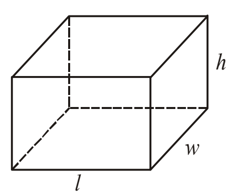


s = side

Volume: $V = s^3$

Surface Area: $S = 6s^2$

RECTANGULAR SOLID



l = length, w = width,

h = height

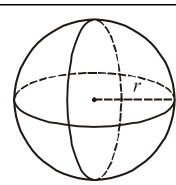
Volume : $V = lwh$

Surface Area :

$S = 2lw + 2lh + 2wh$

SPHERE

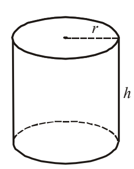
r = radius



Volume: $V = \frac{4}{3} \pi r^3$

Surface Area : $S = 4\pi r^2$

RIGHT CIRCULAR CYLINDER



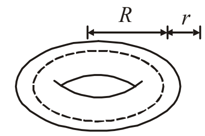
r = radius, h = height

Volume: $V = \pi r^2 h$

Surface Area:

$S = 2\pi rh + 2\pi r^2$

TORUS



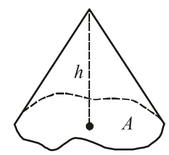
r = tube radius,

R = torus radius

Volume: $V = 2\pi^2 r^2 R$

Surface Area : $S = 4\pi^2 rR$

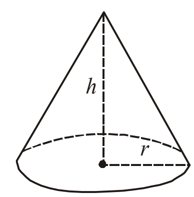
PYRAMID



A = area of base, h = height

Volume: $V = \frac{1}{3} Ah$

RIGHT CIRCULAR CONE



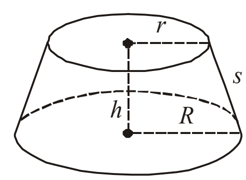
r = radius, h = height

Volume: $V = \frac{1}{3} \pi r^2 h$

Surface Area :

$S = \pi r\sqrt{r^2 + h^2} + \pi r^2$

FRUSTUM OF A CONE

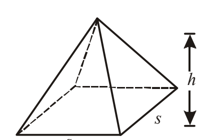


r = top radius,
R = base radius,
h = height,
s = slant height

Volume: $V = \frac{\pi}{3}\left(r^2 + rR + R^2\right)h$

Surface Area : $S = \pi s(R + r) + \pi r^2 + \pi R^2$

SQUARE PYRAMID

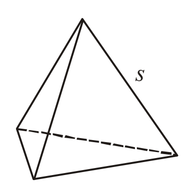


s = side, h = height

Volume : $V = \frac{1}{3} s^2 h$

Surface Area : $S = s(s + \sqrt{s^2 + 4h^2})$

REGULAR TETRAHEDRON



s = side

Volume : $V = \frac{1}{12}\sqrt{2s^3}$

Surface Area: $S = \sqrt{3s^2}$

❑❑❑

QUESTIONS ASKED IN PREVIOUS SSC EXAMS

TYPE -I

1. If the length of the diagonal AC of a square ABCD is 5.2 cm, then the area of the square is :

(1) 15.12 sq.cm
(2) 13.52 sq.cm
(3) 12.62 sq.cm
(4) 10.00 sq.cm.

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. The length of the diagonal of a square is 'a' cm. Which of the following represents the area of the square (in sq. cm.) ?

(1) 2a (2) $\frac{a}{\sqrt{2}}$
(3) $a^2/2$ (4) $a^2/4$

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

3. The diagonal of a square is $4\sqrt{2}$ cm. The diagonal of another square whose area is double that of the first square is :

(1) $8\sqrt{2}$ cm (2) 16 cm
(3) $\sqrt{32}$ cm (4) 8 cm

(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (IInd Sitting)

4. The diagonal of a square A is $(a+b)$. The diagonal of a square whose area is twice the area of square A, is

(1) $2\,(a+b)$ (2) $2\,(a+b)^2$
(3) $\sqrt{2}\,(a+b)$ (4) $\sqrt{2}\,(a-b)$

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

5. The difference of the areas of two squares drawn on two line segments of different lengths is 32 sq.cm. Find the length of the greater line segment if one is longer than the other by 2 cm.

(1) 7 cm (2) 9 cm
(3) 11 cm (4) 16 cm

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

6. If the diagonals of two squares are in the ratio of 2 : 5, their area will be in the ratio of

(1) $\sqrt{2} : \sqrt{5}$ (2) 2 : 5
(3) 4 : 25 (4) 4 : 5

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

7. The perimeter of five squares are 24 cm, 32 cm, 40 cm, 76 cm and 80 cm respectively. The perimeter of another square equal in area to sum of the areas of these squares is :

(1) 31 cm (2) 62 cm
(3) 124 cm (4) 961 cm

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

8. The ratio of the area of a square to that of the square drawn on its diagonal is :

(1) 1 : 1 (2) 1 : 2
(3) 1 : 3 (4) 1 : 4

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

9. From four corners of a square sheet of side 4 cm, four pieces, each in the shape of arc of a circle with radius 2 cm, are cut out. The area of the remaining portion is :

(1) $(8-\pi)$ sq.cm.
(2) $(16-4\pi)$ sq.cm.
(3) $(16-8\pi)$ sq.cm.
(4) $(4-2\,\pi)$sq.cm.

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

10. The length of diagonal of a square is $15\sqrt{2}$ cm. Its area is

(1) 112.5 cm^2 (2) 450 cm^2
(3) $\frac{225\sqrt{2}}{2}$ cm^2 (4) 225 cm^2

11. A kite in the shape of a square with a diagonal 32 cm attached to an equilateral triangle of the base 8 cm. Approximately how much paper has been used to make it? (Use $\sqrt{3}$ = 1.732)

(1) 539.712 cm^2
(2) 538.721 cm^2
(3) 540.712 cm^2
(4) 539.217 cm^2

(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)
(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

12. The breadth of a rectangular hall is three-fourth of its length. If the area of the floor is 768 sq. m., then the difference between the length and breadth of the hall is:

(1) 8 metres (2) 12 metres
(3) 24 metres (4) 32 metres

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

13. The length of a plot is five times its breadth. A playground measuring 245 square metres occupies half of the total area of the plot. What is the length of the plot?

(1) $35\sqrt{2}$ metres (2) $175\sqrt{2}$ metres
(3) 490 metres (4) $5\sqrt{2}$ metres

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

14. The length of a rectangular garden is 12 metres and its breadth is 5 metres. Find the length of the diagonal of a square garden having the same area as that of the rectangular garden :

(1) $2\sqrt{30}$ m (2) $\sqrt{13}$ m
(3) 13 m (4) $8\sqrt{15}$ m

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

15. A circular wire of diameter 42 cm is folded in the shape of a rectangle whose sides are in the ratio 6 : 5 . Find the area enclosed by the rectangle. (Take $\pi = \frac{22}{7}$)

(1) 540 cm^2 (2) 1080 cm^2
(3) 2160 cm^2 (4) 4320 cm^2

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting)

16. A took 15 sec. to cross a rectangular field diagonally walking at the rate of 52 m/min. and B took the same time to cross the same field along its sides walking at the rate of 68 m/min. The area of the field is :

(1) 30 m^2 (2) 40 m^2
(3) 50 m^2 (4) 60 m^2

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

17. The difference between the length and breadth of a rectangle is 23 m. If its perimeter is 206 m, then its area is

(1) 1520 m^2 (2) 2420 m^2
(3) 2480 m^2 (4) 2520 m^2

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

18. There is a rectangular tank of length 180 m and breadth 120 m in a circular field. If the area of the land portion of the field is 40000 m^2, what is the radius of the field ? (Take $\pi = \frac{22}{7}$)

(1) 130 m (2) 135 m
(3) 140 m (4) 145 m

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

19. The length of a rectangular hall is 5m more than its breadth. The area of the hall is 750m^2. The length of the hall is :

(1) 15 m (2) 22.5 m
(3) 25 m (4) 30 m

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

20. If the length and breadth of a rectangle are in the ratio 3 : 2 and its perimeter is 20 cm, then the area of the rectangle (in cm^2) is :

(1) 24 (2) 48
(3) 72 (4) 96

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

21. A path of uniform width runs round the inside of a rectangular field 38 m long and 32 m wide. If the path occupies 600m^2, then the width of the path is

(1) 30 m (2) 5 m
(3) 18.75 m (4) 10 m

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

22. The length and breadth of a rectangle are increased by 20% and 25% respectively. The increase in the area of the resulting rectangle will be :

(1) 60% (2) 50%
(3) 40% (4) 30%

(SSC CHSL DEO & LDC Exam. 27.11.2010)

23. The length of a room floor exceeds its breadth by 20 m. The area of the floor remains unaltered when the length is decreased by 10 m but the breadth is increased by 5 m. The area of the floor (in square metres) is :

(1) 280 (2) 325
(3) 300 (4) 420

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

24. A street of width 10 metres surrounds from outside a rectangular garden whose measurement is 200 m × 180 m. The area of the path (in square metres) is

(1) 8000 (2) 7000
(3) 7500 (4) 8200

(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

25. In measuring the sides of a rectangle, there is an excess of 5% on one side and 2% deficit on the other. Then the error per-cent in the area is

(1) 3·3% (2) 3·0%
(3) 2·9% (4) 2·7%

(SSC Multi-Tasking (Non-Technical) Staff Exam. 22.02.2011)

26. A lawn is in the form of a rectangle having its breadth and length in the ratio 3 : 4. The area of the lawn is $\frac{1}{12}$ hectare. The breadth of the lawn is

(1) 25 metres (2) 50 metres
(3) 75 metres (4) 100 metres

(SSC Graduate Level Tier-II Exam. 29.09.2013

27. The area of a rectangle is thrice that of a square. The length of the rectangle is 20 cm and the breadth of the rectangle is $\frac{3}{2}$ times that of the side of the square. The side of the square, (in cm) is

(1) 10 (2) 20
(3) 30 (4) 60

(SSC Graduate Level Tier-II Exam. 29.09.2013

28. The length and breadth of a rectangular field are in the ratio 7 : 4. A path 4 m wide running all around outside has an area of 416 m^2 . The breadth (in m) of the field is

(1) 28 (2) 14
(3) 15 (4) 16

(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

29. ABC is a triangle with base AB. D is a point on AB such that AB = 5 and DB = 3. What is the ratio of the area of ΔADC to the area of ΔABC ?

(1) 3/2 (2) 2/3
(3) 3/5 (4) 2/5

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

30. If the area of a triangle is 1176 cm^2 and base : corresponding altitude is 3 : 4, then the altitude of the triangle is :

(1) 42 cm (2) 52 cm
(3) 54 cm (4) 56 cm

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

31. The base of a triangle is 15 cm and height is 12 cm. The height of another triangle of double the area having the base 20 cm is :

(1) 9 cm (2) 18 cm
(3) 8 cm (4) 12.5 cm

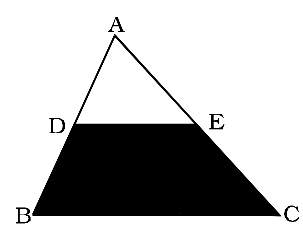
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

32. The sides of a triangle are 3 cm, 4 cm and 5 cm. The area (in cm^2) of the triangle formed by joining the mid points of this triangle is :

(1) 6 (2) 3
(3) $\frac{3}{2}$ (4) $\frac{3}{4}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

33. If D and E are the mid-points of the side AB and AC respectively of the ΔABC in the figure given here, the shaded region of the triangle is what per cent of the whole triangular region?



(1) 50% (2) 25%
(3) 75% (4) 60%

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

34. The ratio of base of two triangles is $x : y$ and that of their areas is $a : b$. Then the ratio of their corresponding altitudes will be:

(1) $\frac{a}{x}:\frac{b}{y}$ (2) $ax : by$
(3) $ay : bx$ (4) $\frac{x}{a}:\frac{b}{y}$

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

35. The diagonal of a right angle isosceles triangle is 5 cm. Its area will be

(1) 5 sq.cm (2) 6.25 sq.cm
(3) 6.50 sq.cm (4) 12.5 sq.cm

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

36. In an isosceles triangle, the measure of each of equal sides is 10 cm and the angle between them is 45°. the area of the triangle is

(1) 25 cm^2 (2) $\frac{25}{2}\sqrt{2}$ cm^2

(3) $25\sqrt{2}$ cm^2 (4) $25\sqrt{3}$ cm^2

(SSC CPO S.I. Exam. 03.09.2006)

37. From a point in the interior of an equilateral triangle, the length of the perpendiculars to the three sides are 6 cm, 8 cm and 10 cm respectively. The area of the triangle is

(1) 48 cm^2 (2) $16\sqrt{3}$ cm^2

(3) $192\sqrt{3}$ cm^2 (4) 192 cm^2

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

38. The area of two equilateral triangles are in the ratio 25 : 36. Their altitudes will be in the ratio :

(1) 36 : 25 (2)25 : 36

(3) 5 : 6 (4) $\sqrt{5}:\sqrt{6}$

(SSC CPO S.I. Exam. 16.12.2007)

39. ABC is an equilateral triangle of side 2 cm. With A, B, C as centre and radius 1 cm three arcs are drawn. The area of the region within the triangle bounded by the three arcs is

(1) $\left(3\sqrt{3}-\frac{\pi}{2}\right)$ cm^2

(2) $\left(\sqrt{3}-\frac{3\pi}{2}\right)$ cm^2

(3) $\left(\sqrt{3}-\frac{\pi}{2}\right)$ cm^2

(4) $\left(\frac{\pi}{2}-\sqrt{3}\right)$ cm^2

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

40. The area of a right-angled isosceles triangle having hypotenuse $16\sqrt{2}$ cm is

(1) 144 cm^2 (2) 128 cm^2
(3) 112 cm^2 (4) 110 cm^2

(SSC (South Zone) Investigator Exam. 12.09.2010)

41. The sides of a triangle are in the ratio 2 : 3 : 4. The perimeter of the triangle is 18 cm. The area (in cm^2) of the triangle is

(1) 9 (2) 36

(3) $\sqrt{42}$ (4) $3\sqrt{15}$

(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

42. If the numerical value of the perimeter of an equilateral triangle is $\sqrt{3}$ times the area of it, then the length of each side of the triangle is

(1) 2 units (2) 3 units
(3) 4 units (4) 6 units

FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

43. Each side of an equilateral triangle is 6 cm. Find its area.

(1) $9\sqrt{3}$ sq.cm. (2) $6\sqrt{3}$ sq.cm.

(3) $4\sqrt{3}$ sq.cm. (4) $8\sqrt{3}$ sq.cm.

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

44. If a triangle with base 8 cm has the same area as a circle with radius 8 cm, then the corresponding altitude (in cm) of the triangle is

(1) 12π (2) 20π
(3) 16π (4) 32π

(SSC Data Entry Operator Exam. 02.08.2009)

45. The measures (in cm) of sides of a right angled triangle are given by consecutive integers. Its area (in cm^2) is

(1) 9 (2) 8
(3) 5 (4) 6

(SSC Data Entry Operator Exam. 02.08.2009)

46. The area of an equilateral triangle is $4\sqrt{3}$ cm^2. The length of each side of the triangle is :

(1) 3 cm (2) $2\sqrt{2}$ cm

(3) $2\sqrt{3}$ cm (4) 4 cm

(SSC CHSL DEO & LDC Exam. 27.11.2010)

47. The length of three medians of a triangle are 9 cm, 12 cm and 15 cm. The area (in sq. cm) of the triangle is

(1) 24 (2) 72
(3) 48 (4) 144

(SSC Graduate Level Tier-II Exam.16.09.2012)

48. The area of the triangle formed by the straight line $3x + 2y = 6$ and the co-ordinate axes is

(1) 3 square units
(2) 6 square units
(3) 4 square units
(4) 8 square units

(SSC Graduate Level Tier-II Exam.16.09.2012)

49. The ratio of length of each equal side and the third side of an isosceles triangle is 3 : 4. If the area of the triangle is $18\sqrt{5}$ square units, the third side is

(1) 16 units (2) $5\sqrt{10}$ units

(3) $8\sqrt{2}$ units (4) 12 units

(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

50. The ratio of sides of a triangle is 3 : 4 : 5. If area of the triangle is 72 square unit, then the length of the smallest side is :

(1) $4\sqrt{3}$ unit (2) $5\sqrt{3}$ unit

(3) $6\sqrt{3}$ unit (4) $3\sqrt{3}$ unit

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

51. If the length of each side of an equilateral triangle is increased by 2 unit, the area is found to be increased by $3+\sqrt{3}$ square unit. The length of each side of the triangle is

(1) $\sqrt{3}$ unit (2) 3 unit

(3) $3\sqrt{3}$ unit (4) $1+3\sqrt{3}$ unit

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

52. What is the area of the triangle whose sides are 9cm, 10cm and 11cm?

(1) 30 cm^2 (2) 60cm^2

(3) $30\sqrt{2}$ cm^2 (4) $60\sqrt{2}$ cm^2

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

53. The area of an isosceles triangle is 4 square unit. If the length of the third side is 2 unit, the length of each equal side is

(1) 4 units (2) $2\sqrt{3}$ units

(3) $\sqrt{17}$ units (4) $3\sqrt{2}$ units

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

54. The ratio of sides of a triangle is 3:4:5 and area of the triangle is 72 square unit. Then the area of an equilateral triangle whose perimeter is same as that of the previous triangle is

(1) $32\sqrt{3}$ square units

(2) $48\sqrt{3}$ square units

(3) 96 square units

(4) $60\sqrt{3}$ square units

(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

55. A right angled isosceles triangle is inscribed in a semi-circle of radius 7 cm. The area enclosed by the semi-circle but exterior to the triangle is

(1) 14 cm^2 (2) 28 cm^2

(3) 44 cm^2 (4) 68 cm^2

(SSC Delhi Police S.I. Exam. 19.08.2012)

56. What is the area of a triangle having perimeter 32cm, one side 11cm and difference of other two sides 5cm?

(1) $8\sqrt{30}$ cm^2 (2) $5\sqrt{35}$ cm^2

(3) $6\sqrt{30}$ cm^2 (4) $8\sqrt{2}$ cm^2

(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

57. The area (in sq. unit) of the triangle formed in the first quadrant by the line $3x + 4y = 12$ is

(1) 8 (2) 12

(3) 6 (4) 4

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

58. The height of an equilateral triangle is 15 cm. The area of the triangle is

(1) $50\sqrt{3}$ sq. cm.

(2) $70\sqrt{3}$ sq. cm.

(3) $75\sqrt{3}$ sq. cm.

(4) $150\sqrt{3}$ sq. cm.

(SSC Graduate Level Tier-I Exam. 19.05.2013)

59. The area of an equilateral triangle is $9\sqrt{3}$ m^2. The length (in m) of the median is

(1) $2\sqrt{3}$ (2) $3\sqrt{3}$

(3) $3\sqrt{2}$ (4) $2\sqrt{2}$

(SSC Graduate Level Tier-II Exam. 29.09.2013

60. The sides of a triangle are 16 cm, 12 cm and 20 cm. Find the area.

(1) 64 cm^2 (2) 112 cm^2

(3) 96 cm^2 (4) 81 cm^2

(SSC CHSL DEO & LDC Exam. 20.10.2013)

61. 360 sq. cm and 250 sq. cm are the area of two similar triangles. If the length of one of the sides of the first triangle be 8 cm, then the length of the corresponding side of the second triangle is

(1) $6\frac{1}{5}$ cm (2) $6\frac{1}{3}$ cm

(3) $6\frac{2}{3}$ cm (4) 6 cm

(SSC CHSL DEO & LDC Exam. 20.10.2013)

62. The perimeter of an isosceles triangle is 544 cm and each of the equal sides is $\frac{5}{6}$ times the base. What is the area (in cm^2) of the triangle ?

(1) 38172 (2) 18372

(3) 31872 (4) 13872

(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

63. The altitude drawn to the base of an isosceles triangle is 8 cm and its perimeter is 64 cm. The area (in cm^2) of the triangle is

(1) 240 (2) 180

(3) 360 (4) 120

(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

64. The perimeter of a rhombus is 40 m and its height is 5 m. Its area is :

(1) 60 m^2 (2) 50 m^2

(3) 45 m^2 (4) 55m^2

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

65. The area of a field in the shape of a trapezium measures 1440 m^2. The perpendicular distance between its parallel sides is 24 m. If the ratio of the parallel sides is 5 : 3, the length of the longer parallel side is :

(1) 75 m (2) 45 m

(3) 120 m (4) 60 m

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

66. The area of a rhombus is 150 cm^2. The length of one of its diagonals is 10 cm. The length of the other diagonal is :

(1) 25 cm (2) 30 cm

(3) 35 cm (4) 40 cm

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

67. The perimeter of a rhombus is 100 cm. If one of its diagonals is 14 cm, then the area of the rhombus is

(1) 144 cm^2 (2) 225 cm^2

(3) 336 cm^2 (4) 400 cm^2

(SSC Data Entry Operator Exam. 31.08.2008)

68. If the measure of one side and one diagonal of a rhombus are 10 cm and 16 cm respectively, then its area (in cm^2) is :

(1) 60 (2) 64

(3) 96 (4) 100

(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

69. The ratio of the length of the parallel sides of a trapezium is 3:2. The shortest distance between them is 15 cm. If the area of the trapezium is 450 cm^2, the sum of the length of the parallel sides is

(1) 15 cm (2) 36 cm

(3) 42 cm (4) 60 cm

(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

70. A parallelogram has sides 15 cm and 7 cm long. The length of one of the diagonals is 20 cm. The area of the parallelogram is

(1) 42 cm^2 (2) 60 cm^2

(3) 84 cm^2 (4) 96 cm^2

(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

71. Sides of a parallelogram are in the ratio 5 : 4. Its area is 1000 sq. units. Altitude on the greater side is 20 units. Altitude on the smaller side is

(1) 30 units (2) 25 units

(3) 10 units (4) 15 units

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

72. The perimeter of a rhombus is 40 cm and the measure of an angle is 60°, then the area of it is :

(1) $100\sqrt{3}$ cm^2 (2) $50\sqrt{3}$ cm^2

(3) $160\sqrt{3}$ cm^2 (4) 100 cm^2

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

73. The parallel sides of a trapezium are in a ratio 2 : 3 and their shortest distance is 12 cm. If the area of the trapezium is 480 sq. cm., the longer of the parallel sides is of length :
(1) 56 cm (2) 36 cm
(3) 42 cm (4) 48 cm
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

74. If the sum of the length, breadth and height of a rectangular parallelopiped is 24 cm and the length of its diagonal is 15 cm, then its total surface area is
(1) 256 cm^2 (2) 265 cm^2
(3) 315 cm^2 (4) 351 cm^2
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

75. The perimeter of a non-square rhombus is 20 cm. One of its diagonal is 8 cm. The area of the rhombus is
(1) 28 sq cm (2) 20 sq cm
(3) 22 sq cm (4) 24 sq cm
(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

76. The perimeter of a rhombus is 100 cm and one of its diagonals is 40 cm. Its area (in cm^2) is
(1) 1200 (2) 1000
(3) 600 (4) 500
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

77. In • ABC, D and E are the points of sides AB and BC respectively such that DE | | AC and AD : DB = 3 : 2. The ratio of area of trapezium ACED to that of Δ BED is
(1) 4 : 15 (2) 15 : 4
(3) 4 : 21 (4) 21 : 4
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

78. ABCD is a trapezium in which AB| |DC and AB = 2 CD. The diagonals AC and BD meet at O. The ratio of area of triangles AOB and COD is
(1) 1 : 1 (2) $1:\sqrt{2}$
(3) 4 : 1 (4) 1 : 4
(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

79. The length of each side of a rhombus is equal to the length of the side of a square whose diagonal is $40\sqrt{2}$ cm. If the length of the diagonals of the rhombus are in the ratio 3 : 4, then its area (in cm^2) is
(1) 1550 (2) 1600
(3) 1535 (4) 1536
(SSC CHSL DEO & LDC Exam. 10.11.2013 (IInd Sitting)

80. The area of a regular hexagon of side $2\sqrt{3}$ cm is :
(1) $18\sqrt{3}$ cm^2 (2) $12\sqrt{3}$ cm^2
(3) $36\sqrt{3}$ cm^2 (4) $27\sqrt{3}$ cm^2
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

81. Each side of a regular hexagon is 1 cm. The area of the hexagon is
(1) $\frac{3\sqrt{3}}{2}$ cm^2 (2) $\frac{3\sqrt{3}}{4}$ cm^2
(3) $4\sqrt{3}$ cm^2 (4) $3\sqrt{2}$ cm^2
(SSC CPO S.I. Exam. 05.09.2004)

82. An equilateral triangle of side 6 cm has its corners cut off to form a regular hexagon. Area (in cm^2) of this regular hexagon will be
(1) $3\sqrt{3}$ (2) $3\sqrt{6}$
(3) $6\sqrt{3}$ (4) $\frac{5\sqrt{3}}{2}$
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

83. The ratio of the area of a regular hexagon and an equilateral triangle having same perimeter is
(1) 2: 3 (2) 6: 1
(3) 3: 2 (4) 1: 6
(SSC MTS (Non-Technical Exam. 20.02.2011) & (SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

84. The area of a sector of a circle of radius 5 cm, formed by an arc of length 3.5 cm is :
(1) 8.5 cm^2 (2) 8.75 cm^2
(3) 7.75 cm^2 (4) 7.50 cm^2
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

85. The area (in sq. cm.) of the largest circle that can be drawn inside a square of side 28 cm, is :
(1) 17248 (2) 784
(3) 8624 (4) 616
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

86. If the circumference of a circle increases from 4π to 8π, what change occurs in its area?
(1) It doubles (2) It triples
(3) It quadruples (4) It is halved
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

87. The area of the ring between two concentric circles, whose circumference are 88 cm and 132 cm, is :
(1) 780 cm^2 (2) 770 cm^2
(3) 715 cm^2 (4) 660 cm^2
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

88. Three circles of radius 3.5 cm each are placed in such a way that each touches the other two. The area of the portion enclosed by the circles is
(1) 1.975 cm^2 (2) 1.967 cm^2
(3) 19.67 cm^2 (4) 21.21 cm^2
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

89. The area of a circular garden is 2464 sq.m. How much distance will have to be covered if you like to cross the garden along its diameter ? (Use $\pi = \frac{22}{7}$)
(1) 56 m (2) 48 m
(3) 28 m (4) 24 m
(SSC CPO S.I. Exam. 07.09.2003)

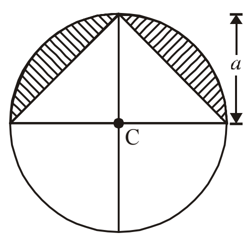
90. Four equal circles each of radius 'a' units touch one another. The area enclosed between them ($\pi = \frac{22}{7}$), in square units, is
(1) $3a^2$ (2) $\frac{6a^2}{7}$
(3) $\frac{41a^2}{7}$ (4) $\frac{a^2}{7}$
(SSC CPO S.I. Exam. 07.09.2003)

91. Three coins of the same size (radius 1 cm) are placed on a table such that each of them touches the other two. The area enclosed by the coins is
(1) $\left(\frac{\pi}{2}-\sqrt{3}\right)cm^2$
(2) $\left(\sqrt{3}-\frac{\pi}{2}\right)cm^2$
(3) $\left(2\sqrt{3}-\frac{\pi}{2}\right)cm^2$
(4) $\left(3\sqrt{3}-\frac{\pi}{2}\right)cm^2$
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

92. The area of the largest triangle, that can be inscribed in a semi-circle of radius r cm, is
(1) $2r$ cm^2 (2) r^2 cm^2
(3) $2r^2$ cm^2 (4) $\frac{1}{2}r^2$ cm^2
(SSC CPO S.I. Exam. 05.09.2004)

93. The area of circle whose radius is 6 cm is trisected by two concentric circles. The radius of the smallest circle is
(1) $2\sqrt{3}$ cm (2) $2\sqrt{6}$ cm
(3) 2 cm (4) 3 cm
(SSC CPO S.I. Exam. 03.09.2006)

94. The area of the shaded region in the figure given below is



(1) $\frac{a^2}{2}\left(\frac{\pi}{2}-1\right)$ sq. units
(2) a^2 $(\pi - 1)$ sq. units
(3) $a^2\left(\frac{\pi}{2}-1\right)$ sq. units
(4) $\frac{a^2}{2}$ $(\pi - 1)$ sq. units
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

95. The area of a circle is increased by 22 cm its radius is increased by 1 cm. The original radius of the circle is
(1) 6 cm (2) 3.2 cm
(3) 3 cm (4) 3.5 cm
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

96. The radius of circle A is twice that of circle B and the radius of circle B is twice that of circle C. Their area will be in the ratio
(1) 16 : 4 : 1 (2) 4 : 2 : 1
(3) 1 : 2 : 4 (4) 1 : 4 : 16
(SSC CPO S.I. Exam. 06.09.2009)

97. The circumference of a circle is 11 cm and the angle of a sector of the circle is 60°. The area of the sector is (use $\pi = \frac{22}{7}$)
(1) $1\frac{29}{48}$ cm^2 (2) $2\frac{29}{48}$ cm^2
(3) $1\frac{27}{48}$ cm^2 (4) $2\frac{27}{48}$ cm^2
(SSC Data Entry Operator Exam. 31.08.2008)

98. A 7 m wide road runs outside around a circular park, whose circumference is 176 m. The area of the road is :
[use $\pi = \frac{22}{7}$]
(1) 1386 m^2 (2) 1472 m^2
(3) 1512 m^2 (4) 1760 m^2
(SSC CHSL DEO & LDC Exam. 27.11.2010)

99. The four equal circles of radius 4 cm drawn on the four corners of a square touch each other externally. Then the area of the portion between the square and the four sectors is
(1) 9 $(\pi - 4)$ sq. cm.
(2) 16 $(\pi - 4)$ sq. cm.
(3) 9 $(4 - \pi)$ sq. cm.
(4) 16 $(4 - \pi)$ sq.cm.
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

100. If the four equal circles of radius 3 cm touch each other externally, then the area of the region bounded by the four circles is
(1) $4(9 - \pi)$ sq.cm
(2) $9(4 - \pi)$ sq.cm
(3) $5(6 - \pi)$ sq.cm
(4) $6(5 - \pi)$ sq.cm
(SSCCHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

101. The area of a circle is increased by 22 cm^2 when its radius is increased by 1 cm. The original radius of the circle is
(1) 3 cm (2) 5 cm
(3) 7 cm (4) 9 cm
(SSC Graduate Level Tier-II Exam.16.09.2012)

102. The radii of two circles are 5cm and 12cm. The area of a third circle is equal to the sum of the area of the two circles. The radius of the third circle is :
(1) 13 cm (2) 21 cm
(3) 30 cm (4) 17 cm
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

103. The perimeter of a semicircular path is 36 m. Find the area of this semicircular path.
(1) 42sq.m (2) 54 sq. m
(3) 63 sq.m (4) 77 sq. m
(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

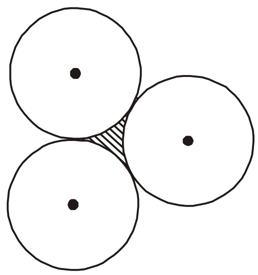
104. The ratio between the area of two circles is 4 : 7. What will be the ratio of their radii?
(1) $2 : \sqrt{7}$ (2) 4 : 7
(3) 16 : 49 (4) $4 : \sqrt{7}$
(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

105. Three circles of radius a, b, c touch each other externally. The area of the triangle formed by joining their centre is
(1) $\sqrt{(a+b+c)abc}$
(2) $(a+b+c)\sqrt{ab+bc+ca}$
(3) $ab + bc + ca$
(4) None of the above
(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

106. The area of a circle is proportional to the square of its radius. A small circle of radius 3 cm is drawn within a larger circle of radius 5 cm. Find the ratio of the area of the annular zone to the area of the larger circle. (Area of the annular zone is the difference between the area of the larger circle and that of the smaller circle).
(1) 9 : 16 (2) 9 : 25
(3) 16 : 25 (4) 16 : 27
(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

107. The diameter of two circles are the side of a square and the diagonal of the square. The ratio of the area of the smaller circle and the larger circle is
(1) 1 : 2 (2) 1 : 4
(3) $\sqrt{2} : \sqrt{3}$ (4) $1 : \sqrt{2}$
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

108. Three circles of equal radius '*a*' cm touch each other. The area of the shaded region is :



(1) $\left(\frac{\sqrt{3}+\pi}{2}\right)a^2$sq.cm

(2) $\left(\frac{6\sqrt{3}-\pi}{2}\right)a^2$sq.cm

(3) $\left(\sqrt{3}-\pi\right)a^2$sq.cm

(4) $\left(\frac{2\sqrt{3}-\pi}{2}\right)a^2$sq.cm

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

109. The radii of two circles are 10 cm and 24 cm. The radius of a circle whose area is the sum of the area of these two circles is

(1) 36 cm (2) 17 cm
(3) 34 cm (4) 26 cm

(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

110. The area of the greatest circle inscribed inside a square of side 21 cm is (Take $\pi = \frac{22}{7}$)

(1) 344.5 cm^2 (2) 364.5 cm^2
(3) 346.5 cm^2 (4) 366.5 cm^2

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

111. The area of the greatest circle, which can be inscribed in a square whose perimeter is 120 cm, is :

(1) $\frac{22}{7}\times(15)^2$ cm^2

(2) $\frac{22}{7}\times\left(\frac{7}{2}\right)^2$ cm^2

(3) $\frac{22}{7}\times\left(\frac{15}{2}\right)^2$ cm^2

(4) $\frac{22}{7}\times\left(\frac{9}{2}\right)^2$ cm^2

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

112. The area of the incircle of an equilateral triangle of side 42 cm is $\left(\text{Take } \pi = \frac{22}{7}\right)$:

(1) 231 cm^2 (2) 462cm^2
(3) $22\sqrt{3}$ cm^2 (4) 924 cm^2

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

113. The ratio of the area of the in-circle and the circum-circle of a square is

(1) 1 : 2 (2) $\sqrt{2}$: 1
(3) 1 : $\sqrt{2}$ (4) 2: 1

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting, Delhi Zone)

114. The area of an equilateral triangle inscribed in a circle is $4\sqrt{3}$ cm^2. The area of the circle is

(1) $\frac{16}{3}\pi cm^2$ (2) $\frac{22}{3}\pi cm^2$
(3) $\frac{28}{3}\pi cm^2$ (4) $\frac{32}{3}\pi cm^2$

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (IInd Sitting) & (SSC SAS Exam. 26.06.2010 (Paper-I)

115. The area of the largest circle, that can be drawn inside a rectangle with sides 18 cm. by 14 cm, is

(1) 49 cm^2 (2) 154 cm^2
(3) 378 cm^2 (4) 1078 cm^2

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

116. A circle is inscribed in an equilateral triangle of side 8 cm. The area of the portion between the triangle and the circle is

(1) 11 cm^2 (2) 10.95 cm^2
(3) 10 cm^2 (4) 10.50 cm^2

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

117. If the difference between areas of the circumcircle and the incircle of an equilateral triangle is 44 cm^2, then the area of the triangle is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 28 cm^2 (2) $7\sqrt{3}$ cm^2
(3) $14\sqrt{3}$ cm^2 (4) 21 cm^2

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

118. If the area of a circle inscribed in a square is 9π cm^2, then the area of the square is

(1) 24 cm^2 (2) 30 cm^2
(3) 36 cm^2 (4) 81 cm^2

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

119. The sides of a triangle are 6 cm, 8 cm and 10 cm. The area of the greatest square that can be inscribed in it, is

(1) 18 cm^2 (2) 15 cm^2
(3) $\frac{2304}{49}cm^2$ (4) $\frac{576}{50}cm^2$

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

120. The length of a side of an equilateral triangle is 8 cm. The area of the region lying between the circumference and the incircle of the triangle is (Use $\pi = \frac{22}{7}$)

(1) $50\frac{1}{7}$ cm^2 (2) $50\frac{2}{7}cm^2$
(3) $75\frac{1}{7}$ cm^2 (4) $75\frac{2}{7}$ cm^2

(SSC CPO S.I. Exam. 09.11.2008)

121. The length of each side of an equilateral triangle is $14\sqrt{3}$ cm. The area of the incircle (in cm^2), is

(1) 450 (2) 308
(3) 154 (4) 77

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 Paper-I)

122. The area of a circle inscribed in a square of area 2 m^2 is

(1) $\frac{\pi}{4}m^2$ (2) $\frac{\pi}{2}m^2$
(3) πm^2 (4) $2\pi m^2$

FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

123. Length of the perpendiculars from a point in the interior of an equilateral triangle on its sides are 3 cm, 4 cm and 5 cm. Area of the triangle is

(1) 48 $\sqrt{3}$ cm^2 (2) 54 $\sqrt{3}$ cm^2
(3) 72 $\sqrt{3}$ cm^2 (4) 80 $\sqrt{3}$ cm^2

(SSC Data Entry Operator Exam. 02.08.2009)

124. The ratio of the areas of the circumcircle and the incircle of an equilateral triangle is
(1) 2 : 1 (2) 4 : 1
(3) 8 : 1 (4) 3 : 2
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

125. Area of the incircle of an equilateral triangle with side 6 cm is
(1) $\frac{\pi}{2}$ sq. cm. (2) $\sqrt{3}\pi$ sq. cm.
(3) 6π sq. cm. (4) 3π sq. cm.
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

126. The area of the square inscribed in a circle of radius 8 cm is
(1) 256 sq. cm (2) 250 sq. cm
(3) 128 sq. cm (4) 125 sq. cm
(SSC Graduate Level Tier-II Exam.16.09.2012)

127. A circle is inscribed in an equilateral triangle and a square is inscribed in that circle. The ratio of the areas of the triangle and the square is
(1) $\sqrt{3} : 4$ (2) $\sqrt{3} : 8$
(3) $3\sqrt{3} : 2$ (4) $3\sqrt{3} : 1$
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

128. The ratio of the area of an equilateral triangle and that of its circumcircle is
(1) $2\sqrt{3} : 2\pi$ (2) $4 : \pi$
(3) $3\sqrt{3} : 4\pi$ (4) $7\sqrt{2} : 2\pi$
(SSC Multi-Tasking Staff Exam. 24.03.2013, Ist Sitting)

129. Between a square of perimeter 44 cm and a circle of circumference 44 cm, which figure has larger area and by how much?
(1) Square, 33cm^2
(2) Circle, 33 cm^2
(3) Both have equal area.
(4) Square, 495 cm^2
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

130. The perimeter of a square and a circular field are the same. If the area of the circular field is 3850 sq metres,what is the area (in m^2) of the square?
(1) 4225 (2) 3025
(3) 2500 (4) 2025
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

131. The areas of a square and a rectangle are equal. The length of the rectangle is greater than the length of any side of the square by 5 cm and the breadth is less by 3 cm. Find the perimeter of the rectangle.
(1) 17 cm (2) 26 cm
(3) 30 cm (4) 34 cm
(SSC CGL Prelim Exam. 24.02.2002 (IInd Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting))

132. If a wire is bent into the shape of a square, the area of the square is 81 sq. cm. When the wire is bent into a semicircular shape, the area of the semicircle (taking $\pi = \frac{22}{7}$) is :
(1) 154 cm^2 (2) 77 cm^2
(3) 44 cm^2 (4) 22 cm^2
(SSC CGL Prelim Exam. 24.02.2002 (IInd Sitting) & (SSC CGL Tier-I Exam. 26.06.2011 (IInd Sitting)

133. The perimeter of a rectangle is 160 metre and the difference of two sides is 48 metre. Find the side of a square whose area is equal to the area of this rectangle.
(1) 32 m (2) 8 m
(3) 4 m (4) 16 m
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting)

134. If the area of a triangle with base 12 cm is equal to the area of a square with side 12 cm, the altitude of the triangle will be
(1) 12 cm (2) 24 cm
(3) 18 cm (4) 36 cm
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting)

135. The area (in m^2) of the square which has the same perimeter as a rectangle whose length is 48 m and is 3 times its breadth, is :
(1) 1000 (2) 1024
(3) 1600 (4) 1042
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

136. A square and an equilateral triangle are drawn on the same base. The ratio of their area is
(1) 2 : 1 (2) 1 : 1
(3) $\sqrt{3} : 4$ (4) $4 : \sqrt{3}$
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

137. A wire, when bent in the form of a square, encloses a region having area 121 cm^2. If the same wire is bent into the form of a circle, then the area of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 144 cm^2 (2) 180 cm^2
(3) 154 cm^2 (4) 176 cm^2
(SSC CGL Prelim Exam. 27.07.2008 (Ist Sitting) & (SSC HSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

138. A copper wire is bent in the form of an equilateral triangle and has area $121\sqrt{3}$ cm^2. If the same wire is bent into the form of a circle, the area (in cm^2) enclosed by the wire is (Take $\pi = \frac{22}{7}$)
(1) 364.5 (2) 693.5
(3) 346.5 (4) 639.5
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

139. A copper wire is bent in the shape of a square of area 81cm^2. If the same wire is bent in the form of a semicircle, the radius (in cm) of the semicircle is (Take $\pi = \frac{22}{7}$)
(1) 16 (2) 14
(3) 10 (4) 7
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

140. At each corner of a triangular field of sides 26 m, 28 m and 30 m, a cow is tethered by a rope of length 7 m. The area (in m^2) ungrazed by the cows is
(1) 336 (2) 259
(3) 154 (4) 77
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

141. An equilateral triangle is drawn on the diagonal of a square. The ratio of the area of the triangle to that of the square is
(1) $\sqrt{3} : 2$ (2) $\sqrt{2} : \sqrt{3}$
(3) $2 : \sqrt{3}$ (4) $1 : \sqrt{2}$
(FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

142. A cow is tied on the corner of a rectangular field of size 30 m ×20 m by a 14m long rope. The area of the region, that she can graze, is (use $\pi = \frac{22}{7}$) :
(1) 350 m^2 (2) 196 m^2
(3) 154 m^2 (4) 22 m^2
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

143. A circle and a square have equal areas. The ratio of a side of the square and the radius of the circle is

(1) $1:\sqrt{\pi}$ (2) $\sqrt{\pi}:1$

(3) $1:\pi$ (4) $\pi:1$

(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

144. If the perimeters of a rectangle and a square are equal and the ratio of two adjacent sides of the rectangle is 1 : 2 then the ratio of area of the rectangle and that of the square is

(1) 1 : 1 (2) 1 : 2

(3) 2 : 3 (4) 8 : 9

(SSC Graduate Level Tier-I Exam. 21.04.2013)

145. The perimeter of a triangle and an equilateral triangle are same. Also, one of the sides of the rectangle is equal to the side of the triangle. The ratio of the area of the rectangle and the triangle is

(1) $\sqrt{3}:1$ (2) $1:\sqrt{3}$

(3) $2:\sqrt{3}$ (4) $4:\sqrt{3}$

(SSC Constable (GD) Exam. 12.05.2013 Ist Sitting)

146. The radius of a circle is a side of a square. The ratio of the area of the circle and the square is

(1) $1:\pi$ (2) $\pi:1$

(3) $\pi:2$ (4) $2:\pi$

(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

147. If the length of a rectangle is increased by 25% and the width is decreased by 20%, then the area of the rectangle :

(1) increases by 5%

(2) decreases by 5%

(3) remains unchanged

(4) increases by 10%

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

148. The length of a rectangle is decreased by 10% and its breadth is increased by 10%. By what per cent is its area changed ?

(1) 0% (2) 1%

(3) 5% (4) 100%

(SSC CGL Prelim Exam. 08.02.2004 (Ist Sitting) & (SSC CGL Tier-I Exam. 16.05.2010 (Ist Sitting)

149. The percentage increase in the area of a rectangle, if each of its sides is increased by 20%, is :

(1) 40% (2) 42%

(3) 44% (4) 46%

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

150. If the circumference of a circle is reduced by 50%, its area will be reduced by

(1) 12.5% (2) 25%

(3) 50% (4) 75%

(SSC CPO S.I. Exam. 05.09.2004)

151. If the side of a square is increased by 25%, then its area is increased by :

(1) 25% (2) 55%

(3) 40.5% (4) 56.25%

(SSC CPO S.I. Exam. 26.05.2005)

152. If the radius of a circle is increased by 50%, its area is increased by :

(1) 125% (2) 100%

(3) 75% (4) 50%

(SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting) & (SSC CGL Tier-I Exam. 26.06.2010 (IInd Sitting)

153. If the length of a rectangle is increased by 20% and its breadth is decreased by 20%, then its area

(1) increases by 4%

(2) decreases by 4%

(3) decreases by 1%

(4) remains unchanged

(SSC CPO S.I. Exam. 03.09.2006)

154. If each side of a rectangle is increased by 50%, its area will be increased by

(1) 50% (2) 125%

(3) 100% (4) 250%

(SSC CGL Prelim Exam. 04.02.2007 (IInd Sitting) & (SSC HSL DEO & LDC Exam. 28.11.2010)

155. If the altitude of a triangle is increased by 10% while its area remains same, its corresponding base will have to be decreased by

(1) 10 % (2) 9 %

(3) $9\frac{1}{11}\%$ (4) $11\frac{1}{9}\%$

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (IInd Sitting) & (SSC MTS Exam. 17.03.2013, Kolkata Region)

156. If the circumference of a circle is increased by 50% then the area will be increased by

(1) 50% (2) 75%

(3) 100% (4) 125%

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

157. The length and breadth of a rectangle are increased by 12% and 15% respectively. Its area will be increased by :

(1) $27\frac{1}{5}\%$ (2) $28\frac{4}{5}\%$

(3) 27% (4) 28%

(SSC CPO S.I. Exam. 16.12.2007)

158. Each side of a rectangular field is diminished by 40%. By how much per cent is the area of the field diminished ?

(1) 32% (2) 64%

(3) 25% (4) 16%

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

159. The length of rectangle is increased by 60%. By what percent would the breadth to be decreased to maintain the same area ?

(1) $37\frac{1}{2}\%$ (2) 60%

(3) 75% (4) 120%

(SSC CPO S.I. Exam. 06.09.2009) & (SSC MTS Exam. 17.03.2013, Kolkata Region)

160. If each side of a square is increased by 10%. its area will be increased by

(1) 10% (2) 21%

(3) 44% (4) 100%

(SSC CGL Tier-I Exam. 16.05.2010 (IInd Sitting) & (SSC SAS Exam. 26.06.2010 (Paper-I)

161. If the length of a rectangular plot of land is increased by 5% and the breadth is decreased by 10%, how much will its area increase or decrease ?

(1) 6.5% increase

(2) 5.5% decrease

(3) 5.5% increase

(4) 6.5% decrease

(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

162. The radius of a circle is increased by 1%. How much does the area of the circle increase ?

(1) 1% (2) 1.1%

(3) 2 % (4) 2.01%

(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

163. In measuring the sides of a rectangle, there is an excess of 5% on one side and 2% deficit on the other. Then the error percent in the area is

(1) 3·3% (2) 3·0%

(3) 2·9% (4) 2·7%

(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

164. The length and breadth of a square are increased by 30% and 20% respectively. The area of the rectangle so formed exceeds the area of the square by

(1) 46% (2) 66%

(3) 42% (4) 56%

(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

165. If each edge of a cube is increased by 40%, the percentage increase in its surface area is

(1) 40% (2) 60%

(3) 80% (4) 96%

(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

166. If the diameter of a circle is increased by 8%, then its area is increased by :

(1) 16.64% (2) 6.64%

(3) 16% (4) 16.46%

(SSC Multi-Tasking Staff Exam. 10.03.2013)

167. One side of a square is increased by 30%. To maintain the same area, the other side will have to be decreased by

(1) $23\frac{1}{13}\%$ (2) $76\frac{12}{13}\%$

(3) 30% (4) 15%

(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting))

168. The length and breadth of a rectangle are doubled. Percentage increase in area is

(1) 150% (2) 200%

(3) 300% (4) 400%

(SSC CHSL DEO & LDC Exam. 20.10.2013)

169. ABC is an equilateral triangle. P and Q are two points on $\overline{AB}$ and $\overline{AC}$ respectively such that $\overline{PQ}$ || $\overline{BC}$. If $\overline{PQ}$ = 5 cm, then area of ΔAPQ is :

(1) $\frac{25}{4}$ sq. cm (2) $\frac{25}{\sqrt{3}}$ sq. cm

(3) $\frac{25\sqrt{3}}{4}$ sq. cm (4) $25\sqrt{3}$ sq. cm

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

170. If area of an equilateral triangle is a and height b, then value of $\frac{b^2}{a}$ is:

(1) 3 (2) $\frac{1}{3}$

(3) $\sqrt{3}$ (4) $\frac{1}{\sqrt{3}}$

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

171. ABC is an isosceles right angled triangle with ∠B = 90°. On the sides AC and AB, two equilateral triangles ACD and ABE have been constructed. The ratio of area of ΔABE and ΔACD is

(1) 1 : 3 (2) 2 : 3

(3) 1 : 2 (4) 1 : $\sqrt{2}$

(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

172. Two triangles ABC and DEF are similar to each other in which AB = 10 cm, DE = 8 cm. Then the ratio of the area of triangles ABC and DEF is

(1) 4 : 5 (2) 25 : 16

(3) 64 : 125 (4) 4 : 7

(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

173. If ΔABC is similar to ΔDEF such that BC = 3 cm, EF = 4 cm and area of ΔABC = 54 cm^2, then the area of ΔDEF is :

(1) 66 cm^2 (2) 78 cm^2

(3) 96 cm^2 (4) 54 cm^2

(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

174. The area of two similar triangles ABC and DEF are 20 cm^2 and 45 cm^2 respectively. If AB = 5 cm, then DE is equal to :

(1) 6.5 cm (2) 7.5 cm

(3) 8.5 cm (4) 5.5 cm

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

175. ABCD is a parallelogram. BC is produced to Q such that BC = CQ. Then

(1) area (Δ BCP) = area (Δ DPQ)

(2) area (Δ BCP) > area (Δ DPQ)

(3) area (Δ BCP) < area (Δ DPQ)

(4) area (Δ BCP) + area (Δ DPQ) = area (ΔBCD)

(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

176. The ratio of the length of the parallel sides of a trapezium is 3:2. The shortest distance between them is 15 cm. If the area of the trapezium is 450 cm^2, the sum of the length of the parallel sides is

(1) 15 cm (2) 36 cm

(3) 42 cm (4) 60 cm

(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

177. C_1 and C_2 are two concentric circles with centre at O. Their radii are 12 cm. and 3 cm. respectively. B and C are the point of contact of two tangents drawn to C_2 from a point A lying on the circle C_1. Then, the area of the quadrilateral ABOC is

(1) $\frac{9\sqrt{15}}{2}$ sq. cm.

(2) $12\sqrt{15}$ sq. cm.

(3) $9\sqrt{15}$ sq. cm.

(4) $6\sqrt{15}$ sq. cm.

(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

178. From a point P which is at a distance of 13 cm from centre O of a circle of radius 5 cm, in the same plane, a pair of tangents PQ and PR are drawn to the circle. Area of quadrilateral PQOR is

(1) 65 cm^2 (2) 60 cm^2

(3) 30 cm^2 (4) 90 cm^2

(SSC Graduate Level Tier-I Exam. 21.04.2013)

179. In Δ ABC, O is the centroid and AD, BE, CF are three medians and the area of Δ AOE = 15 cm^2, then area of quadrilateral BDOF is

(1) 20 cm^2 (2) 30 cm^2

(3) 40 cm^2 (4) 25 cm^2

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

180. A straight line parallel to the base BC of the triangle ABC intersects AB and AC at the points D and E respectively. If the area of the ΔABE be 36 sq.cm, then the area of the ΔACD is

(1) 18 sq.cm (2) 36 sq.cm

(3) 18 cm (4) 36 cm

(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

181. If in a Δ ABC, the medians CD and BE intersect each other at 0, then the ratio of the areas of Δ ODE and Δ ABC is

(1) 1 : 6 (2) 6 : 1

(3) 1 : 12 (4) 12 : 1

(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

182. Three circles of radii 4 cm, 6 cm and 8 cm touch each other pairwise externally. The area of the triangle formed, by the line-segments joining-the centres of the three circles is

(1) $144\sqrt{13}$ sq. cm

(2) $12\sqrt{105}$ sq. cm

(3) $6\sqrt{6}$ sq. cm

(4) $24\sqrt{6}$ sq. cm

(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

183. Two circles with centre A and B and radius 2 units touch each other externally at 'C'. A third circle with centre 'C' and radius '2' units meets other two at D and E. Then the area of the quadrilateral ABDE is

(1) $2\sqrt{2}$ sq. units

(2) $3\sqrt{3}$ sq. units

(3) $3\sqrt{2}$ sq. units

(4) $2\sqrt{3}$ sq. units

(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

184. ABC is a right angled triangle, B being the right angle. Mid-points of BC and AC are respectively B′ and A′. The ratio of the area of the quadrilateral AA′ B′B to the area of the triangle ABC is

(1) 1 : 2 (2) 2 : 3

(3) 3 : 4

(4) None of the above

(SSC Graduate Level Tier-I Exam. 21.04.2013)

185. Two triangles ABC and PQR are congruent. If the area of Δ ABC is 60 sq. cm, then area of Δ PQR will be

(1) 60 sq.cm (2) 30 sq.cm

(3) 15 sq.cm (4) 120 sq.cm

(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

186. In ΔPQR, the line drawn from the vertex P intersects QR at a point S. If QR = 4.5 cm and SR = 1.5 cm then the ratios of the area of triangle PQS and triangle PSR is

(1) 4 : 1 (2) 3 : 1

(3) 3 : 2 (4) 2 : 1

(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

187. The difference between the radii of the bigger circle and smaller circle is 14 cm and the difference between their areas is 1056 cm^2. Radius of the smaller circle is

(1) 7 cm (2) 5 cm

(3) 9 cm (4) 3 cm

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

188. ABCD is parallelogram. P and Q are the mid-points of sides BC and CD respectively. If the area of Δ ABC is 12 cm^2, then the area of Δ APQ is

(1) 12 cm^2 (2) 8 cm^2

(3) 9 cm^2 (4) 10 cm^2

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

189. ABC is a right angled triangle. B being the right angle. Mid-points of BC and AC are respectiveely B′ and A′. Area of ΔA′B′C′ is

(1) $\frac{1}{2}$ × area of ΔABC

(2) $\frac{2}{3}$ × area of ΔABC

(3) $\frac{1}{4}$ × area of ΔABC

(4) $\frac{1}{8}$ × area of ΔABC

(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

190. A wire of length 44 cm is first bent to form a circle and then rebent to form a square. The difference of the two enclosed areas is

(1) 44 cm^2 (2) 33 cm^2

(3) 55 cm^2 (4) 66 cm^2

(SSC CGL Tier-I Exam. 19.10.2014)

191. A parallelogram has sides 60 m and 40m and one of its diagonals is 80 m long. Its area is

(1) $500\sqrt{15}$ m^2

(2) $600\sqrt{15}$ m^2

(3) $400\sqrt{15}$ m^2

(4) $450\sqrt{15}$ m^2

(SSC CGL Tier-I Exam. 26.10.2014)

192. $\angle$ACB is an angle in the semicircle of diameter AB = 5 and AC : BC = 3 : 4. The area of the triangle ABC is

(1) $6\sqrt{2}$ sq. cm (2) 4 sq. cm

(3) 12 sq. cm (4) 6 sq. cm

(SSC CGL Tier-I Exam. 26.10.2014)

193. If the lengths of the sides AB, BC and CA of a triangle ABC are 10 cm, 8 cm and 6 cm respectively and if M is the mid - point of BC and MN || AB to cut AC at N, then the area of the trapezium ABMN is equal to

(1) 18 sq. cm. (2) 20 sq. cm.

(3) 12 sq. cm. (4) 16 sq. cm.

194. ABCD is a trapezium with AD and BC parallel sides. E is a point on BC. The ratio of the area of ABCD to that of AED is

(1) $\frac{\overline{AD}}{\overline{BC}}$ (2) $\frac{\overline{BE}}{\overline{EC}}$

(3) $\frac{\overline{AD}+\overline{BE}}{\overline{AD}+\overline{CE}}$ (4) $\frac{\overline{AD}+\overline{BC}}{\overline{AD}}$

(SSC CGL Tier-II Exam. 21.09.2014)

195. In an equilateral triangle of side 24 cm, a circle is inscribed touching its sides. The area of the remaining portion of the triangle is

$(\sqrt{3} = 1.732)$

(1) 98.55 sq cm (2) 100 sq cm

(3) 101 sq cm (4) 95 sq cm

(SSC CGL Tier-II Exam. 21.0.2014)

196. Perimeter of a rhombus is 2p unit and sum of length of diagonals is m unit, then area of the rhombus is

(1) $\frac{1}{4}m^2p$ sq unit

(2) $\frac{1}{4}mp^2$ sq unit

(3) $\frac{1}{4}(m^2 - p^2)$ sq unit

(4) $\frac{1}{4}(p^2 - m^2)$ sq unit

(SSC CGL Tier-II Exam. 21.09.2014)

197. Two sides of a plot measuring 32 m and 24 m and the angle between them is a perfect right angle. The other two sides measure 25 m each and the other three angles are not right angles. The area of the plot in m^2 is

(1) 768 (2) 534

(3) 696.5 (4) 684

(SSC CGL Tier-II Exam. 21.09.2014)

198. a and b are two sides adjacent to the right angle of a right-angled triangle and p is the perpendicular drawn to the hypotenuse from the opposite vertex. Then p^2 is equal to

(1) $a^2 + b^2$ (2) $\frac{1}{a^2}+\frac{1}{b^2}$

(3) $\frac{a^2b^2}{a^2+b^2}$ (4) $a^2 - b^2$

(SSC CGL Tier-II Exam. 21.09.2014)

199. A is the centre of circle whose radius is 8 and B is the centre of a circle whose diameter is 8. If these two circles touch externally, then the area of the circle with diameter AB is

(1) 36 π (2) 64 π

(3) 144 π (4) 256 π

(SSC CGL Tier-II Exam. 21.09.2014)

200. The length of a rectangle is increased by 10% and breadth decreased by 10%. The area of the new rectangle is

(1) neither increased nor decreased

(2) increased by 1%

(3) decreased by 2%

(4) decreased by 1%

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

201. If the numerical values of the height and the area of an equilateral triangle be same, then the length of each side of the triangle is

(1) 2 units (2) 4 units

(3) 5 units (4) 8 units

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

202. If the length of a side of the square is equal to that of the diameter of a circle, then the ratio of the area of the square and that of the circle is

$\left(\pi = \frac{22}{7}\right)$

(1) 14 : 11 (2) 7 : 11

(3) 11 : 14 (4) 11 : 7

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

203. The median of an equilateral triangle is $6\sqrt{3}$ cm. The area (in cm^2) of the triangle is

(1) 72 (2) 108

(3) $72\sqrt{3}$ (4) $36\sqrt{3}$

(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

204. If the numerical value of the circumference and area of a circle is same, then the area is

(1) 6 π sq. unit (2) 4 π sq. unit

(3) 8 π sq. unit (4) 12 π sq. unit

(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

205. The area of an equilateral triangle is 48 sq. cm. The length of the side is

(1) $\sqrt{8} \times 4$ cm (2) $4\sqrt{3}$ cm

(3) 8 cm (4) 16 cm

(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

206. Area of regular hexagon with side 'a' is

(1) $\frac{3\sqrt{3}}{4}a^2$ sq. unit

(2) $\frac{12}{2\sqrt{3}}a^2$ sq. unit

(3) $\frac{9}{2\sqrt{3}}a^2$ sq. unit

(4) $\frac{6}{\sqrt{2}}a^2$ sq. unit

(SSC CHSL DEO & LDC Exam. 9.11.2014)

207. The external fencing of a circular path around a circular plot of land is 33 m more than its interior fencing. The width of the path around the plot is

(1) 5.52 m (2) 5.25 m

(3) 2.55 m (4) 2.25 m

(SSC CHSL DEO & LDC Exam. 9.11.2014)

208. In ΔABC, D and E are two points on the sides AB and AC respectively so that DE | | BC and $\frac{AD}{BD} = \frac{2}{3}$. Then

$\frac{\text{the area of trapezium DECB}}{\text{the area of }\Delta\text{ABC}}$ is equal to

(1) $\frac{5}{9}$ (2) $\frac{21}{25}$

(3) $1\frac{4}{5}$ (4) $5\frac{1}{4}$

(SSC CHSL DEO & LDC Exam. 9.11.2014)

209. The sides of a rhombus are 10 cm each and a diagonal measures 16 cm. Area of the rhombus is

(1) 96 sq.cm (2) 160 sq.cm

(3) 100 sq. cm (4) 40 sq.cm

(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

210. The perimeter of a triangle is 54 m and its sides are in the ratio of 5 : 6 : 7. The area of the triangle is

(1) 18 m^2 (2) $54\sqrt{6}$ m^2

(3) $27\sqrt{2}$ m^2 (4) 25 m^2

(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

211. The lengths of two parallel sides of a trapezium are 6 cm and 8 cm. If the height of the trapezium be 4 cm, then its area is

(1) 28 cm (2) 28 sq.cm

(3) 30 sq.cm (4) 30 cm

(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

212. If a and b are the lengths of the sides of a right triangle whose hypotenuse is 10 and whose area is 20, then the value of $(a+b)^2$ is

(1) 140 (2) 180

(3) 120 (4) 160

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

213. A wire is bent into the form of a circle, whose area is 154 cm^2. If the same wire is bent into the form of an equilateral triangle, the approximate area of the equilateral triangle is

(1) 93.14 cm^2 (2) 90.14 cm^2

(3) 83.14 cm^2 (4) 39.14 cm^2

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

214. If the ratio of the altitudes of two triangles be 3 : 4 and the ratio of their corresponding areas be 4 : 3, then the ratio of their corresponding lengths of bases is

(1) 1 : 1 (2) 16 : 9

(3) 1 : 2 (4) 2 : 1

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

215. Let A be the area of a square whose each side is 10 cm. Let B be the area of a square whose diagonals are 14 cm each. Then (A – B) is equal to

(1) 0 (2) 1

(3) 2 (4) 4

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

216. Two sides of a parallelogram are 20 cm and 25 cm. If the altitude corresponding to the side of length 25 cm is 10 cm, then the altitude corresponding to the other pair of sides is

(1) 10.5 cm (2) 12 cm
(3) 12.5 cm (4) 10 cm

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

217. If the sides of an equilateral triangle be increased by 1 m its area is increased by $\sqrt{3}$ sq. metre. The length of any of its sides is

(1) 2 metre (2) $\frac{5}{2}$ metre
(3) $\frac{3}{2}$ metre (4) $\sqrt{3}$ metre

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

218. The in-radius of a triangle is 6 cm, and the sum of the lengths of its sides is 50 cm. The area of the triangle (in square cm.) is

(1) 150 (2) 50
(3) 300 (4) 56

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

219. One of the angles of a right-angled triangle is 15°, and the hypotenuse is 1 metre. The area of the triangle (in square cm.) is

(1) 1220 (2) 1200
(3) 1250 (4) 1215

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

220. If for an isosceles triangle the length of each equal side is 'a' units and that of the third side is 'b' units, then its area will be

(1) $\frac{a}{4}\sqrt{4b^2 - a^2}$ square units
(2) $\frac{a}{2}\sqrt{2a^2 - b^2}$ square units
(3) $\frac{b}{4}\sqrt{4a^2 - b^2}$ square units
(4) $\frac{b}{2}\sqrt{a^2 - 2b^2}$ square units

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

221. The outer and inner diameter of a circular path be 728 metre and 700 metre respectively. The breadth of the path is

(1) 7 metre (2) 28 metre
(3) 14 metre (4) 20 metre

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

222. The area of the parallelogram whose length is 30 cm, width is 20 cm and one diagonal is 40 cm is

(1) 200 $\sqrt{15}$ cm^2
(2) 100 $\sqrt{15}$ cm^2
(3) 300 $\sqrt{15}$ cm^2
(4) 150 $\sqrt{15}$ cm^2

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

223. On increasing each side of a square by 50%, the ratio of the area of new square formed and the given square will be

(1) 9 : 5 (2) 9 : 3.5
(3) 9 : 7 (4) 9 : 4

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

224. The area of a circle is 324 π square cm. The length of its longest chord (in cm.) is

(1) 36 (2) 28
(3) 38 (4) 32

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

225. The area of a rhombus is 256 square cm. and one of its diagonals is twice the other in length. Then length of its larger diagonal is

(1) 32 cm (2) 16 cm
(3) 48 cm (4) 24 cm

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

226. If the side of a square is $\frac{1}{2}$ $(x + 1)$ units and its diagonal is $\frac{3 - x}{\sqrt{2}}$ units, then the length of the side of the square would be

(1) $\frac{4}{3}$ units (2) $\frac{1}{2}$ unit
(3) 1 unit (4) 2 units

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

227. The circumference of a triangle is 24 cm and the circumference of its in-circle is 44 cm. Then the area of the triangle is (taking $\pi = \frac{22}{7}$)

(1) 56 square cm.
(2) 84 square cm.
(3) 48 square cm.
(4) 68 square cm.

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

228. If the length of each of two equal sides of an isosceles triangle is 10 cm. and the adjacent angle is 45°, then the area of the triangle is

(1) 20 $\sqrt{2}$ square cm.
(2) 12 $\sqrt{2}$ square cm.
(3) 25 $\sqrt{2}$ square cm.
(4) 15 $\sqrt{2}$ square cm.

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

229. The length of the diagonal of a rectangle with sides 4 m and 3 m would be

(1) 12 m (2) 7 m
(3) 5 m (4) 14 m

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

230. In a right angled triangle ΔPQR, PR is the hypotenuse of length 20 cm, $\angle PRQ = 30°$, the area of the triangle is

(1) $50\sqrt{3}$ cm^2 (2) $100\sqrt{3}$ cm^2
(3) $25\sqrt{3}$ cm^2 (4) $\frac{100}{\sqrt{3}}$ cm^2

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

231. The perimeter of an equilateral triangle is equal to the circumference of a circle. The ratio of their areas is

$\left(\text{Use } \pi = \frac{22}{7}\right)$

(1) $22 : 21\sqrt{3}$ (2) $21 : 22\sqrt{3}$
(3) $21 : 22\sqrt{2}$ (4) $22 : 21\sqrt{2}$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

232. From any point inside an equilateral triangle, the lengths of perpendiculars on the sides are 'a' cm, 'b' cm and 'c' cms. Its area (in cm^2) is

(1) $\frac{\sqrt{2}}{3}(a+b+c)$

(2) $\frac{\sqrt{3}}{3}(a+b+c)^2$

(3) $\frac{\sqrt{3}}{3}(a+b+c)$

(4) $\frac{\sqrt{2}}{3}(a+b+c)^2$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

233. The areas of a circle and a square are same. The ratio of the side of the square to the radius of the circle is

(1) $2\pi : 1$ (2) $1 : \sqrt{\pi}$

(3) $\sqrt{\pi} : 1$ (4) $1 : \pi$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

234. ABCD is a square inscribed in a circle of radius r. Then the total area (in square units) of the portions of the circle lying outside the square is

(1) $\pi(r^2 - 4)$ (2) $2\pi(r^2 - 1)$

(3) $\pi^2 r(r - 7)$ (4) $r^2(\pi - 2)$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

235. The lengths of the two parallel sides of a trapezium are 28 cm and 40 cm. If the length of each of its other two sides be 12 cm, then the area (in cm^2) of the trapezium is

(1) $312\sqrt{5}$ (2) $408\sqrt{3}$

(3) $204\sqrt{3}$ (4) $504\sqrt{3}$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

236. The perimeter of a sheet of paper in the shape of a quadrant of a circle is 75 cm. Its area would be $\left(\pi = \frac{22}{7}\right)$

(1) 100 cm^2 (2) 346.5 cm^2

(3) 693 cm^2 (4) 512.25 cm^2

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

237. The diagonal of a quadrilateral shaped field is 24m and the perpendiculars dropped on it from the remaining opposite vertices are 8m and 13m. The area of the field is

(1) 252 m^2 (2) 156 m^2

(3) 96 m^2 (4) 1152 m^2

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

238. Two isosceles triangles have equal vertical angles and their areas are in the ratio 9:16. Then the ratio of their corresponding heights is-

(1) 4.5 : 8 (2) 4 : 3

(3) 8 : 4.5 (4) 3 : 4

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

239. In ΔABC, a line through A cuts the side BC at D such that BD : DC = 4 : 5. If the area of ΔABD = 60 cm^2, then the area of ΔADC is

(1) 90 cm^2 (2) 50 cm^2

(3) 60 cm^2 (4) 75 cm^2

(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

240. If the area of a circle is A, radius of the circle is r and circumference of it is C, then

(1) $\frac{A}{r} = C$ (2) rC = 2A

(3) $\frac{C}{A} = \frac{r}{2}$ (4) $AC = \frac{r^2}{4}$

(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

241. In a rhombus ABCD, $\angle A = 60°$ and AB = 12 cm. Then the diagonal BD is

(1) 10 cm (2) $2\sqrt{3}$ cm

(3) 6 cm (4) 12 cm

(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

242. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, $\angle$BGC = 60° and BC = 8 cm then area of the triangle ABC is

(1) $96\sqrt{3}$ cm^2 (2) $64\sqrt{3}$ cm^2

(3) $48\sqrt{3}$ cm^2 (4) 48 cm^2

(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

243. Two circles touch each other externally. The sum of their areas is 130 π sq cm and the distance between their centres is 14 cm. The radius of the smaller circle is

(1) 2 cm (2) 4 cm

(3) 5 cm (4) 3 cm

(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

244. Let C_1 and C_2 be the inscribed and circumscribed circles of a triangle with sides 3cm, 4cm and 5cm then $\frac{\text{area of } C_1}{\text{area of } C_2}$ is

(1) $\frac{9}{25}$ (2) $\frac{4}{25}$

(3) $\frac{9}{16}$ (4) $\frac{16}{25}$

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

245. If the altitude of an equilateral triangle is $12\sqrt{3}$ cm, then its area would be :

(1) 12 cm^2 (2) $144\sqrt{3}$ cm^2

(3) 72 cm^2 (4) $36\sqrt{3}$ cm^2

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

246. Given that : $\Delta ABC \sim \Delta PQR$, If $\frac{\text{area }(\Delta PQR)}{\text{area }(\Delta ABC)} = \frac{256}{441}$ and PR = 12 cm, then AC is equal to

(1) 15.75 cm (2) 16 cm

(3) $12\sqrt{2}$ cm (4) 15.5 cm

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

247. ABCD is a cyclic quadrilateral. Diagonals AC and BD meets at P. If $\angle APB = 110°$ and $\angle CBD = 30°$, then $\angle ADB$ measures

(1) 55° (2) 30°

(3) 70° (4) 80°

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

248. A circular swimming pool is surrounded by a concrete wall 4m wide. If the area of the concrete wall surrounding the pool is $\frac{11}{25}$ that of the pool, then the radius (in m) of the pool is :

(1) 8 (2) 16

(3) 30 (4) 20

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

249. Δ ABC is similar to Δ DEF. The ratio of their perimeters is 4 : 1. The ratio of their areas is
(1) 4 : 1 (2) 16 : 1
(3) 8 : 1 (4) $8\sqrt{2}$: 1
(SSC CGL Tier-I Re-Exam, 30.08.2015)

250. The amount of rice produced in a square field of side 50 m is 750 kg. The amount of rice produced in a similar square field of side 100 m will be
(1) 2000 kg (2) 3000 kg
(3) 3500 kg (4) 1500 kg
(SSC Constable (GD) Exam, 04.10.2015, IInd Sitting)

251. The time required for a boy to travel along the external and internal boundaries of a circular path are in the ratio 20 : 19. If the width of the path be 5 metres, the internal diameter is :
(1) 195 metres (2) 192 metres
(3) 180 metres (4) 190 metres
(SSC Constable (GD) Exam, 04.10.2015, IInd Sitting)

252. In triangle ABC, DE | | BC where D is a point on AB and E is a point on AC. DE divides the area of Δ ABC into two equal parts. Then DB : AB is equal to
(1) $\sqrt{2} : (\sqrt{2}+1)$
(2) $\sqrt{2} : (\sqrt{2}-1)$
(3) $(\sqrt{2}-1) : \sqrt{2}$
(4) $(\sqrt{2}+1) : \sqrt{2}$
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

253. The centroid of a Δ ABC is G. The area of Δ ABC is 60 cm^2. The area of ΔGBC is
(1) 10 cm^2 (2) 30 cm^2
(3) 40 cm^2 (4) 20 cm^2
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

254. In trapezium ABCD, AB | | CD and AB = 2CD. Its diagonals intersect at O. If the area of ΔAOB = 84 cm^2, then the area of ΔCOD is equal to
(1) 72 cm^2 (2) 21 cm^2
(3) 42 cm^2 (4) 26 cm^2
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

255. Given that the ratio of altitudes of two triangles is 4 : 5, ratio of their areas is 3 : 2. The ratio of their corresponding bases is
(1) 8 : 15 (2) 15 : 8
(3) 5 : 8 (4) 8 : 5
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

256. The area of an isosceles trapezium is 176 cm^2 and the height is $\frac{2}{11}$th of the sum of its parallel sides. If the ratio of the length of the parallel sides is 4 : 7, then the length of a diagonal (in cm) is
(1) 28 (2) $\sqrt{137}$
(3) $2\sqrt{137}$ (4) 24
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

257. The area of a circle whose radius is the diagonal of a square whose area is 4 sq. units is :
(1) 16π sq. units (2) 4π sq. units
(3) 6π sq. units (4) 8π sq. units
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

258. A rectangular carpet has an area of 120 m^2 and a perimeter of 46 metre. The length of its diagonal is :
(1) 23 metre (2) 13 metre
(3) 17 metre (4) 21 metre
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

259. A plate on square base made of brass is of length x cm and width 1 mm. The plate weighs 4725 gm. If 1 cubic cm of brass weighs 8.4 gram, then the value of x is :
(1) 75 (2) 76
(3) 72 (4) 74
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

260. The length of two parallel sides of a trapezium are 15 cm and 20 cm. If its area is 175 sq.cm, then its height is :
(1) 15 cm (2) 10 cm
(3) 20 cm (4) 25 cm
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

261. ABCD is a square. Draw a triangle QBC on side BC considering BC as base and draw a triangle PAC on AC as its base such that ΔQBC ~ ΔPAC. Then, $\frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC}$ is equal to :
(1) $\frac{1}{2}$ (2) $\frac{2}{1}$
(3) $\frac{1}{3}$ (4) $\frac{2}{3}$
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

262. The hypotenuse of a right–angled triangle is 39 cm and the difference of other two sides is 21 cm. Then, the area of the triangle is
(1) 270 sq. cm (2) 450 sq. cm
(3) 540 sq. cm (4) 180 sq. cm
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

263. The ratio between the length and the breadth of a rectangular park is 3 : 2. If a man cycling along the boundary of the park at the speed of 12 km/hour completes one round in 8 minutes, then the area of the park is
(1) 153650 sq.metre
(2) 135600 sq.metre
(3) 153600 sq.metre
(4) 156300 sq.metre
(SSC CGL Tier-II Online Exam.01.12.2016)

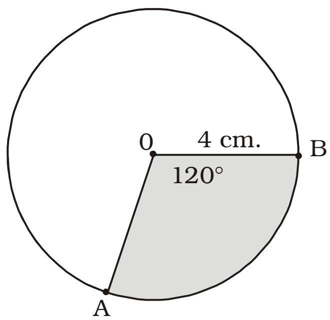
264. A rectangular park 60 metre long and 40 metre wide has two concrete crossroads running in the middle of the park and rest of the park has been used as a lawn. If the area of the lawn is 2109 metre^2 then the width of the road is
(1) 3 metre (2) 5 metre
(3) 6 metre (4) 2 metre
(SSC CGL Tier-II Online Exam.01.12.2016)

265. A square and a regular hexagon are drawn such that all the vertices of the square and the hexagon are on a circle of radius r cm. The ratio of area of the square and the hexagon is
(1) 3 : 4 (2) $4 : 3\sqrt{3}$
(3) $\sqrt{2} : \sqrt{3}$ (4) $1 : \sqrt{2}$
(SSC CGL Tier-II Online Exam.01.12.2016)

266. ΔABC is similar to ΔDEF. If the area of ΔABC is 9 sq.cm. and the area of ΔDEF is 16 sq.cm. and BC = 2.1 cm, then the length of EF will be
(1) 5.6 cm. (2) 2.8 cm.
(3) 3.7 cm. (4) 1.4 cm.
(SSC CGL Tier-II Online Exam.01.12.2016)

267. If D and E are the mid-points of AB and AC respectively of ΔABC, then the ratio of the areas of Δ ADE and $\square$ BCED is
(1) 1 : 2 (2) 1 : 4
(3) 2 : 3 (4) 1 : 3
(SSC CGL Tier-II Online Exam.01.12.2016)

268. What is the area of dark (coloured) sector for the figure given below?



(1) 8.38 (2) 25.28
(3) 16.76 (4) 18.56
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

269. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, angle BGC = 120°, BC = 10 cm, then area of the triangle ABC is :
(1) $50\sqrt{3}$ cm² (2) 60 cm²
(3) 25 cm² (4) $25\sqrt{3}$ cm²
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

270. A room 16m 5cm long and 15 m broad is to be fitted with equal square tiles. How many number of largest possible tiles are required so that they exactly fit?
(1) 10400 (2) 10700
(3) 10800 (4) 9800
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

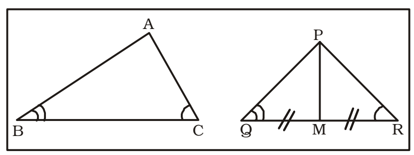
271. Three equal circles of unit radius touch one another. Then the area of the circle circumscribing the three circles is
(1) $6\pi\left(2+\sqrt{3}\right)^2$
(2) $\frac{\pi}{6}\left(2+\sqrt{3}\right)^2$
(3) $\frac{\pi}{3}\left(2+\sqrt{3}\right)^2$
(4) $3\pi\left(2+\sqrt{3}\right)^2$
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

272. Area of the circle inscribed in a square of diagonal $6\sqrt{2}$ cm. (in sq. cm.) is
(1) 9π (2) 6π
(3) 3π (4) $9\sqrt{2}\pi$
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

273. The diagonals of two squares are in the ratio 5 : 2. The ratio of their area is
(1) 5 : 6 (2) 25 : 4
(3) 5 : 4 (4) 125 : 8
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

274. In Δ ABC and Δ PQR, $\angle$ B = $\angle$ Q, $\angle$C = $\angle$R. M is the midpoint of side QR. If AB : PQ = 7 : 4, then

$\dfrac{\text{area}(\Delta ABC)}{\text{area}(\Delta PMR)}$ is :



(1) $\frac{35}{8}$ (2) $\frac{49}{16}$
(3) $\frac{49}{8}$ (4) $\frac{35}{16}$
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

275. The diagonals of two squares are in the ratio of 3 : 7. What is the ratio of their areas?
(1) 3 : 7 (2) 9 : 49
(3) 4 : 7 (4) 7 : 3
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

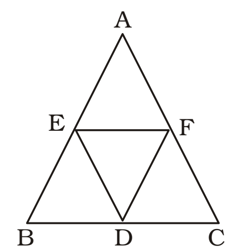
276. A string of length 24 cm is bent first into a square and then into a right–angled triangle by keeping one side of the square fixed as its base. Then the area of triangle equals to :
(1) 24 cm² (2) 60 cm²
(3) 40 cm² (4) 28 cm²
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

277. ABCD is a square. Draw an equilateral triangle PBC on side BC considering BC is a base and an equilateral triangle QAC on diagonal AC considering AC is a base. Find the value of

$\dfrac{\text{Area of } \Delta PBC}{\text{Area of } \Delta QAC}$.

(1) $\frac{1}{2}$ (2) 1
(3) $\frac{1}{3}$ (4) $\frac{1}{4}$
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

278. If D, E and F are the mid–points of the sides of an equilateral triangle ABC, then the ratio of the area of triangle DEF and DCF is :



(1) 1.1 : 1 (2) 1 : 1.1
(3) 0.9 : 1 (4) 1 : 1
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (IInd Sitting)

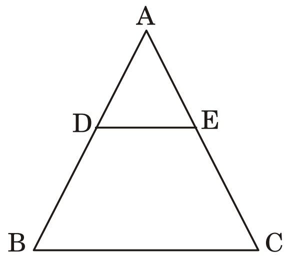
279. The area of a rectangle is 60 cm² and its perimeter is 34 cm, then the length of the diagonal is
(1) 17 cm (2) 11 cm
(3) 15 cm (4) 13 cm
(SSC CGL Tier-I (CBE) Exam. 29.08.2016) (IInd Sitting)

280. The centroid of a triangle ΔABC is G. If the area of Δ ABC = 72 sq. units , then the area of Δ BGC is
(1) 16 sq. units (2) 24 sq. units
(3) 36 sq. units (4) 48 sq. units
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (Ist Sitting)

281. In a trapezium ABCD, AB || CD, AB < CD, CD = 6 cm and distance between the parallel sides is 4 cm. If the area of ABCD is 16 cm², then AB is
(1) 1 cm (2) 2 cm
(3) 3 cm (4) 8 cm
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (Ist Sitting)

282. In a triangle ABC, AB = 8 cm, AC = 10 cm and $\angle$B = 90°, then the area of ΔABC is
(1) 49 sq.cm (2) 36 sq.cm
(3) 25 sq.cm (4) 24 sq.cm
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (Ist Sitting)

283. In figure, DE || BC. If DE = 3 cm, BC = 6 cm and area of ΔADE = 15 sq. cm, then the area of ΔABC is



(1) 75 sq. cm. (2) 45 sq. cm.
(3) 30 sq. cm. (4) 60 sq. cm.
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

284. ΔABC is a right angled triangle, the radius of its circumcircle is 3 cm and the length of its altitude drawn from the opposite vertex to the hypotenuse is 2 cm. Then the area of the triangle is
(1) 12 sq. cm. (2) 3 sq. cm.
(3) 6 sq. cm. (4) 5 sq. cm.
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

285. The lengths of the diagonals of a rhombus are 8 cm and 6 cm. The area of rhombus is :
(1) 96 cm^2 (2) 60 cm^2
(3) 48 cm^2 (4) 24 cm^2
(SSC CGL Tier-I (CBE) Exam. 06.09.2016) (Ist Sitting)

286. Two adjacent sides of a parallelogram are 21 cms and 20 cms. The diagonal joining the end points of these two sides is 29 cms. The area of the parallelogram (in sq. cms) is
(1) 240 (2) 120
(3) 210 (4) 420
(SSC CGL Tier-I (CBE) Exam. 07.09.2016) (Ist Sitting)

287. Δ ABC is an equilateral triangle and D and E are midpoints of AB and BC respectively. Then the area of Δ ABC : the area of the trapezium ADEC is
(1) 5 : 3 (2) 4 : 1
(3) 8 : 5 (4) 4 : 3
(SSC CGL Tier-I (CBE) Exam. 07.09.2016) (Ist Sitting)

288. The perimeters of a square and a rectangle are equal . If their area be 'A' m^2 and 'B' m^2 respectively, then correct statement is
(1) A < B (2) $A \le B$
(3) A > B (4) $A \ge B$
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

289. A rectangle with one side of length 4 cm. is inscribed in a circle of diameter 5 cm. Find, the area of the rectangle.
(1) 21 $cm.^2$ (2) 12 $cm.^2$
(3) 4 $cm.^2$ (4) 3 $cm.^2$
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

290. A rectangle with one side 4 cm is inscribed in a circle of radius 2.5 cm. The area of the rectangle is :
(1) 8 cm^2 (2) 12 cm^2
(3) 16 cm^2 (4) 20 cm^2
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

291. If O is the centroid and AD, BE and CF are the three medians of ΔABC with an area of 96 cm^2 then the area of ΔBOD in cm^2 is
(1) 8 (2) 12
(3) 16 (4) 24
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (IInd Sitting)

292. ΔABC is similar to ΔDEF. If the ratio of similar sides is k : 1, the ratio of their areas is
(1) $k^2 : 1$ (2) $2k : 1$
(3) $\frac{k^2}{2} : 1$ (4) $2k^2 : 1$
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

293. The height of an equilateral triangle is 18 cm. Its area is
(1) $36\sqrt{3}$ square metre
(2) $108\sqrt{3}$ square cm.
(3) 108 square cm.
(4) $96\sqrt{3}$ square metre
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

294. The length and breadth of a rectangular piece of a land are in a ratio 5 : 3. The owner spent Rs. 6000 for surrounding it from all sides at Rs. 7.50 per metre. The difference between its length and breadth is
(1) 50 metre (2) 100 metre
(3) 150 metre (4) 250 metre
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

295. The ratio between the area of a square and that of a circle, when the length of a side of the square is equal to that of the diameter of the circle, is
$\left(\text{Take}, \pi = \frac{22}{7}\right)$
(1) 14 : 11 (2) 28 : 11
(3) 7 : 22 (4) 22 : 7
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

296. A piece of wire 132 cm. long is bent successively in the shape of an equilateral triangle, a square and a circle. Then area will be longest in shape of
(1) Circle
(2) Equilateral triangle
(3) Square
(4) Equal in all the shapes
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

297. Let ΔABC and ΔABD be on the same base AB and between the same parallels AB and CD. Then the relation between areas of triangles ABC and ABD will be
(1) $\Delta ABD = \frac{1}{3}\Delta ABC$
(2) $\Delta ABD = \frac{1}{2}\Delta ABC$
(3) $\Delta ABC = \frac{1}{2}\Delta ABD$
(4) $\Delta ABC = \Delta ABD$
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

298. The perimeter of a rhombus is 240 metre and the distance between any two parallel sides is 20 metre. The area of the rhombus in square metre is
(1) 600 square metre
(2) 1200 square metre
(3) 2400 square metre
(4) 4800 square metre
(SSC CGL Tier-I (CBE) Exam. 28.08.2016 (Ist Sitting)

299. The area of the largest triangle that can be inscribed in a semicircle of radius 6 m is
(1) 36 m^2 (2) 72 m^2
(3) 18 m^2 (4) 12 m^2
(SSC CGL Tier-I (CBE) Exam. 29.08.2016 (Ist Sitting)

300. A circle and a square have same area. The ratio of the side of the square to the radius of the circle will be:
(1) $\sqrt{\pi} : 1$ (2) $1 : \sqrt{\pi}$
(3) $\pi^2 : 1$ (4) $1 : \pi$
(SSC CGL Tier-I (CBE) Exam. 02.09.2016 (IInd Sitting)

301. Point O is the centre of a circle of radius 5 cm. At a distance of 13 cm from O, a point P is taken. From this point, two tangents PQ and PR are drawn to the circle. Then , the area of quadrilateral PQOR is
(1) 60 $cm.^2$ (2) 32.5 $cm.^2$
(3) 65 $cm.^2$ (4) 30 $cm.^2$
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IIIrd Sitting)

302. The length of a median of an equilateral triangle is $12\sqrt{3}$ cms. Then the area of the triangle is :
(1) 144 sq. cm.
(2) $288\sqrt{3}$ sq. cm.
(3) $144\sqrt{3}$ sq. cm.
(4) 288 sq. cm.
(SSC CGL Tier-I (CBE) Exam. 04.09.2016 (IInd Sitting)

303. Two circles touch externally. The sum of their areas is 130π sq. cm. and the distance between their centres is 14 cm. The radius of the bigger circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 22 cm. (2) 11 cm.
(3) 33 cm. (4) 44 cm.
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IInd Sitting)

304. In an equilateral triangle of side 24 cm., a circle is inscribed touching its sides. The area of the remaining portion of the triangle is approximately equal to
$\left(\text{assuming } \pi = \frac{22}{7} \;\&\; \sqrt{3} = 1.732\right)$
(1) 36.6 cm^2 (2) 54.2 cm^2
(3) 72.8 cm^2 (4) 98.5 cm^2
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IInd Sitting)

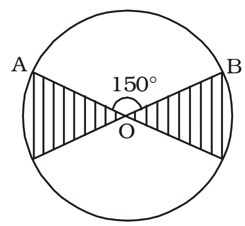
305. The inradius of triangle is 4 cm and its area is 34 sq. cm. the perimeter of the triangle is :
(1) 8.5 cm (2) 17 cm
(3) 34 cm (4) 20 cm
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IIIrd Sitting)

306. The area of a triangle ABC is 10.8 cm^2. If CP = PB and 2AQ = QB, then the area of the triangle APQ is
(1) 3.6 cm^2 (2) 0.9 cm^2
(3) 2.7 cm^2 (4) 1.8 cm^2
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IIIrd Sitting)

307. If a circle of radius 12 cm is divided into two equal parts by one concentric circle, then radius of inner circle is :
(1) 6 cm (2) 4 cm
(3) $6\sqrt{2}$ cm (4) $4\sqrt{2}$ cm
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IIIrd Sitting)

308. In ΔABC, the medians AD and BE meet at G. The ratio of the areas of ΔBDG and the quadrilateral GDCE is :
(1) 1 : 2 (2) 1 : 3
(3) 2 : 3 (4) 3 : 4
(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IInd Sitting)

309. O is the centre of the circle and $\angle$AOB = 150°, and the shaded portion is x part of the circular region, then x = ?



(1) $\frac{1}{12}$ (2) $\frac{1}{9}$
(3) $\frac{1}{6}$ (4) $\frac{1}{4}$
(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IIIrd Sitting)

310. The area of the circle with radius y is w. The difference between the areas of the bigger circle (with radius y) and that of the smaller circle (with radius x) is w'. So $\frac{x}{y}$ is equal to
(1) $\sqrt{1-\frac{w'}{w}}$ (2) $\sqrt{1+\frac{w'}{w}}$
(3) $\sqrt{1+\frac{w}{w'}}$ (4) $\sqrt{1-\frac{w}{w'}}$
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

311. D, E and F are the mid points of the sides BC, CA and AB respectively of a ΔABC. Then the ratio of the areas of ΔDEF and ΔABC is
(1) $\frac{1}{2}$ (2) $\frac{1}{4}$
(3) $\frac{1}{8}$ (4) $\frac{1}{16}$
(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IInd Sitting)

312. An arc AB of a circle subtends an angle x radians at the centre of the circle. Given that the area of the secctor AOB is equal to the square of the length of the arc AB, then the value of x is :
(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$
(3) $\frac{1}{\sqrt{3}}$ (4) $\frac{1}{3}$
(SSC CGL Tier-I (CBE) Exam. 27.10.2016 (Ist Sitting)

313. The radii of two concentric circles are 68 cm and 22 cm. The area of the closed figure bounded by the boundaries of the circles is
(1) 4140π sq. cm. (2) 4110π sq. cm.
(3) 4080π sq. cm. (4) 4050π sq. cm.
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

314. In a trapezium ABCD, AB and DC are parallel sides and $\angle$ADC = 90°. If AB = 15 cm, CD = 40 cm and diagonal AC = 41 cm. then the area of the trapezium ABCD is
(1) 245 cm.^{2} (2) 240 cm.^{2}
(3) 247.5 cm.^{2} (4) 250 cm.^{2}
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

315. The area of a rhombus having one side 10 cm and one diagonal 12 cm is
(1) 48 cm.^{2} (2) 96 cm.^{2}
(3) 144 cm.^{2} (4) 192 cm.^{2}
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

316. The cost of levelling a circular field at 50 paise per square metre is Rs. 7700. The cost (in Rs.) of putting up a fence all round it at Rs. 1.20 per metre is $\left(\text{Use } \pi = \frac{22}{7}\right)$
(1) Rs. 132 (2) Rs. 264
(3) Rs. 528 (4) Rs. 1056
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

317. The sum of the length and breadth of a rectangle is 6 cm. A square is constructed such that one of its sides is equal to a diagonal of the rectangle. If the ratio of areas of the square and rectangle is 5 : 2, the area of the square in cm^2 is
(1) 20 (2) 10
(3) $4\sqrt{5}$ (4) $10\sqrt{2}$
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

318. The length of a side of an equilateral triangle is 8 cm. The area of the region lying between the circum circle and the incircle of the triangle is $\left(\text{Use : } \pi = \frac{22}{7}\right)$
(1) $50\frac{1}{7}$ cm^2 (2) $50\frac{2}{7}$ cm^2
(3) $75\frac{1}{7}$ cm^2 (4) $75\frac{2}{7}$ cm^2
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

319. Two equal circles intersect so that their centres, and the points at which they intersect form a square of side 1 cm. The area (in sq.cm) of the portion that is common to the circles is

(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}-1$

(3) $\frac{\pi}{5}$ (4) $\left(\sqrt{2}-1\right)$

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

320. D and E are points on the sides AB and AC respectively of ΔABC such that DE is parallel to BC and AD : DB = 4 : 5, CD and BE intersect each other at F. Then find the ratio of the areas of ΔDEF and ΔCBF.

(1) 16 : 25 (2) 16 : 81
(3) 81 : 16 (4) 4 : 9

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

331. Diagonals of a Trapezium ABCD with AB || CD intersect each other at the point O. If AB = 2CD, then the ratio of the areas of ΔAOB and ΔCOD is

(1) 4 : 1 (2) 1 : 16
(3) 1 : 4 (4) 16 : 1

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–II

1. The perimeter of two squares are 24 cm and 32 cm. The perimeter (in cm) of a third square equal in area to the sum of the areas of these squares is :

(1) 45 (2) 40
(3) 32 (4) 48

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

2. The perimeter of two squares are 40 cm and 32 cm. The perimeter of a third square whose area is the difference of the area of the two squares is

(1) 24 cm (2) 42 cm
(3) 40 cm (4) 20 cm

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

3. If the ratio of areas of two squares is 225 : 256, then the ratio of their perimeter is :

(1) 225 : 256 (2) 256 : 225
(3) 15 : 16 (4) 16 : 15

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

4. The perimeter of two squares are 40 cm and 24 cm. The perimeter of a third square , whose area is equal to the difference of the area of these squares, is

(1) 34 cm (2) 32 cm
(3) 38 cm (4) 30 cm

(SSC CPO S.I. Exam. 09.11.2008)

5. The length and breadth of a rectangular field are in the ratio of 3 : 2. If the perimeter of the field is 80m, its breadth (in metres) is :

(1) 18 (2) 16
(3) 10 (4) 24

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

6. The sides of a rectangular plot are in the ratio 5:4 and its area is equal to 500 sq.m. The perimeter of the plot is :

(1) 80m. (2) 100m.
(3) 90m. (4) 95m.

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

7. The perimeter of the top of a rectangular table is 28m., whereas its area is $48m^2$. What is the length of its diagonal?

(1) 5m. (2) 10m.
(3) 12m. (4) 12.5 m.

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

8. If the length and the perimeter of a rectangle are in the ratio 5 : 16, then its length and breadth will be in the ratio

(1) 5 : 11 (2) 5 : 8
(3) 5 : 4 (4) 5 : 3

(SSC CPO S.I. Exam. 09.11.2008)

9. The length and perimeter of a rectangle are in the ratio 5:18. Then length and breadth will be in the ratio

(1) 4 : 3 (2) 3 : 5
(3) 5 : 4 (4) 4 : 7

(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

10. If the area of a rectangle be $(x^2 + 7x + 10)$ sq. cm, then one of the possible perimeter of it is

(1) $(4x + 14)$ cm (2) $(2x + 14)$ cm
(3) $(x + 14)$ cm (4) $(2x + 7)$ cm

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

11. The perimeter of a rectangular plot is 48 m and area is 108 m^2. The dimensions of the plot are

(1) 36 m and 3 m
(2) 12 m and 9 m
(3) 27 m and 4 m
(4) 18 m and 6 m

(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

12. The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$. If the perimeter of the triangle is 52 cm, the length of the smallest side is :

(1) 24 cm (2) 10 cm
(3) 12 cm (4) 9 cm

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

13. The area of an equilateral triangle is 400 $\sqrt{3}$ sq.m. Its perimeter is :

(1) 120 m (2) 150 m
(3) 90 m (4) 135 m

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

14. From a point in the interior of an equilateral triangle, the perpendicular distance of the sides are $\sqrt{3}$ cm, $2\sqrt{3}$ cm and $5\sqrt{3}$ cm. The perimeter (in cm) of the triangle is

(1) 64 (2) 32
(3) 48 (4) 24

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

15. The perimeter of a triangle is 30 cm and its area is 30 cm^2. If the largest side measures 13 cm, what is the length of the smallest side of the triangle ?

(1) 3 cm (2) 4 cm
(3) 5 cm (4) 6 cm

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

16. The area of a triangle is 216 cm^2 and its sides are in the ratio 3 : 4 : 5. The perimeter of the triangle is :

(1) 6 cm (2) 12 cm
(3) 36 cm (4) 72 cm

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

17. In a triangular field having sides 30m, 72m and 78m, the length of the altitude to the side measuring 72m is :

(1) 25 m (2) 28 m
(3) 30 m (4) 35 m

(SSC CPO S.I. Exam. 16.12.2007)

18. If the perimeter of a right-angled isosceles triangle is $\left(4\sqrt{2}+4\right)$ cm, the length of the hypotenuse is :

(1) 4 cm (2) 6 cm
(3) 8 cm (4) 10 cm

(SSC CPO S.I. Exam. 16.12.2007)

19. Through each vertex of a triangle, a line parallel to the opposite side is drawn. The ratio of the perimeter of the new triangle, thus formed, with that of the original triangle is
(1) 3 : 2 (2) 4 : 1
(3) 2 : 1 (4) 2 : 3
(SSC CPO S.I. Exam. 09.11.2008)

20. The sides of a triangle are in the ratio $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}$ and its perimeter is 94cm. The length of the smallest side of the triangle is:
(1) 18 cm (2) 22.5 cm
(3) 24 cm (4) 27 cm
(SSC CHSL DEO & LDC Exam. 27.11.2010)

21. The length of two sides of an isosceles triangle are 15 and 22 respectively. What are the possible values of perimeter ?
(1) 52 or 59 (2) 52 or 60
(3) 15 or 37 (4) 37 or 29
(SSC CISF Constable (GD) Exam. 05.06.2011)

22. If the perimeter of a right-angled triangle is 56 cm and area of the triangle is 84 sq. cm, then the length of the hypotenuse is (in cm)
(1) 25 (2) 50
(3) 7 (4) 24
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

23. If the length of each median of an equilateral triangle is $6\sqrt{3}$ cm, the perimeter of the triangle is
(1) 24 cm (2) 32 cm
(3) 36 cm (4) 42 cm
(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

24. The area of an equilateral triangle is $4\sqrt{3}$ sq. cm. Its perimeter is
(1) 12 cm (2) 6 cm
(3) 8 cm (4) $3\sqrt{3}$ cm
(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

25. The sides of a triangle are in the ratio $\frac{1}{4}:\frac{1}{6}:\frac{1}{8}$ and its perimeter is 91 cm. The difference of the length of longest side and that of shortest side is
(1) 19 cm (2) 20 cm
(3) 28 cm (4) 21 cm
(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

26. The diagonals of a rhombus are 32 cm and 24 cm respectively. The perimeter of the rhombus is:
(1) 80 cm (2) 72 cm
(3) 68 cm (4) 64 cm
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

27. The diagonals of a rhombus are 24 cm and 10 cm. The perimeter of the rhombus (in cm) is :
(1) 68 (2) 65
(3) 54 (4) 52
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

28. The perimeter of a rhombus is 40 cm. If one of the diagonals be 12cm long, what is the length of the other diagonal ?
(1) 12 cm (2) $\sqrt{136}$ cm
(3) 16 cm (4) $\sqrt{44}$ cm
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

29. The perimeter of a rhombus is 40 cm. If the length of one of its diagonals be 12 cm, the length of the other diagonal is
(1) 14 cm (2) 15 cm
(3) 16 cm (4) 12 cm
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

30. The sides of a quadrilateral are in the ratio 3 : 4 : 5 : 6 and its perimeter is 72 cm. The length of its greatest side (in cm) is
(1) 24 (2) 27
(3) 30 (4) 36
(SSC (South Zone) Investigator Exam. 12.09.2010)

31. The area of a rhombus is 216 cm^2 and the length of its one diagonal is 24 cm. The perimeter (in cm) of the rhombus is
(1) 52 (2) 60
(3) 120 (4) 100
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

32. The area of a circle is 38.5 sq. cm. Its circumference (in cm) is $\left(\text{use } \pi = \frac{22}{7}\right)$:
(1) 22 (2) 24
(3) 26 (4) 32
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

33. The diameter of a toy wheel is 14 cm. What is the distance travelled by it in 15 revolutions?
(1) 880 cm (2) 660 cm
(3) 600 cm (4) 560 cm
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

34. A can go round a circular path 8 times in 40 minutes. If the diameter of the circle is increased to 10 times the original diameter, the time required by A to go round the new path once travelling at the same speed as before is :
(1) 25 min (2) 20 min
(3) 50 min (4) 100 min
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

35. Diameter of a wheel is 3 cm. The wheel revolves 28 times in a minute. To cover 5.280 km distance, the wheel will take (Take $\pi = \frac{22}{7}$) :
(1) 10 minutes (2) 20 minutes
(3) 30 minutes (4) 40 minutes
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

36. Find the diameter of a wheel that makes 113 revolutions to go 2 km 26 decameters. (Take $\pi = \frac{22}{7}$)
(1) $4\frac{4}{13}$ m (2) $6\frac{4}{11}$ m
(3) $12\frac{4}{11}$ m (4) $12\frac{8}{11}$ m
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

37. The radius of a circular wheel is 1.75 m. The number of revolutions that it will make in travelling 11 km., is
(1) 1000 (2) 10,000
(3) 100 (4) 10
(SSC Section Officer (Commercial Audit) Exam. 16.11.2003) (Second Sitting)

38. A circular wire of radius 42 cm is bent in the form of a rectangle whose sides are in the ratio of 6 : 5. The smaller side of the rectangle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 60 cm (2) 30 cm
(3) 25 cm (4) 36 cm
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

39. The number of revolutions, a wheel of diameter 40 cm makes in travelling a distance of 176 m, is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 140 (2) 150
(3) 160 (4) 166

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

40. If the difference between the circumference and diameter of a circle is 30 cm, then the radius of the circle must be

(1) 6 cm (2) 7 cm
(3) 5 cm (4) 8 cm

(SSC CPO S.I. Exam. 03.09.2006)

41. If the perimeter of a semicircular field is 144m, then the diameter of the field is $\left(\text{take } \pi = \frac{22}{7}\right)$

(1) 55m (2) 30m
(3) 28m (4) 56m

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

42. The perimeter (in metres) of a semicircle is numerically equal to its area (in square metres). The length of its diameter is $\left(\text{take } \pi = \frac{22}{7}\right)$

(1) $3\frac{6}{11}$ metres (2) $5\frac{6}{11}$ metres
(3) $6\frac{6}{11}$ metres (4) $6\frac{2}{11}$ metres

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

43. The ratio of the numbers giving the measure of the circumference and the area of a circle of radius 3 cm is

(1) 1 : 3 (2) 2 : 3
(3) 2 : 9 (4) 3 : 2

(SSC CPO S.I. Exam. 09.11.2008)

44. The ratio of the radii of two wheels is 3 : 4. The ratio of their circumference is

(1) 4 : 3 (2) 3 : 4
(3) 2 : 3 (4) 3 : 2

(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

45. The length (in cm) of a chord of a circle of radius 13 cm at a distance of 12 cm from its centre is

(1) 5 (2) 8
(3) 10 (4) 12

(SSC (South Zone) Investigator Exam. 12.09.2010)

46. The diameter of a wheel is 98 cm. The number of revolutions in which it will have to cover a distance of 1540 m is

(1) 500 (2) 600
(3) 700 (4) 800

(SSC CGL Tier-1 Exam.19.06.2011 (First Sitting)

47. The wheel of a motor car makes 1000 revolutions in moving 440 m. The diameter (in metre) of the wheel is

(1) 0.44 (2) 0.14
(3) 0.24 (4) 0.34

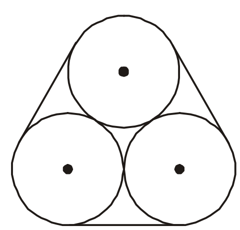
(SSC CGL Tier-1 Exam.19.06.2011 (Second Sitting)

48. A bicycle wheel makes 5000 revolutions in moving 11km.Then the radius of the wheel (in cm) is (Take $\pi = \frac{22}{7}$)

(1) 70 (2) 35
(3) 17.5 (4) 140

(SSC CGL Tier-1 Exam.26.06.2011 (First & Second Sitting)

49. Three circles of diameter 10 cm each, are bound together by a rubber band, as shown in the figure.



The length of the rubber band, (in cm) if it is stretched as shown, is

(1) 30 (2) $30 + 10\pi$
(3) 10π (4) $60 + 20\pi$

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

50. If a chord of length 16 cm is at a distance of 15 cm from the centre of the circle, then the length of the chord of the same circle which is at a distance of 8 cm from the centre is equal to

(1) 10 cm (2) 20 cm
(3) 30 cm (4) 40 cm

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

51. A semicircular shaped window has diameter of 63 cm. Its perimeter equals $\left(\pi = \frac{22}{7}\right)$

(1) 126 cm (2) 162 cm
(3) 198 cm (4) 251 cm

(SSC CISF Constable (GD) Exam. 05.06.2011)

52. A gear 12 cm in diameter is turning a gear 18 cm in diameter. When the smaller gear has 42 revolutions, how many has the larger one made ?

(1) 28 (2) 20
(3) 15 (4) 24

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

53. The perimeter of a semi-circular area is 18cm, then the radius is : (using $\pi = \frac{22}{7}$)

(1) $5\frac{1}{3}$ cm (2) $3\frac{1}{2}$ cm
(3) 6 cm (4) 4 cm

(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

54. A circular road runs around a circular ground. If the difference between the circumference of the outer circle and the inner circle is 66 metres, the width of the road is: (Take $\pi = \frac{22}{7}$)

(1) 10.5 metres (2) 7 metres
(3) 5.25 metres (4) 21 metres

(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

55. A person observed that he required 30 seconds less time to cross a circular ground along its diameter than to cover it once along the boundary. If his speed was 30 m/minute, then the radius of the circular ground is (Take $\pi = \frac{22}{7}$) :

(1) 5.5 m (2) 7.5 m
(3) 10.5 m (4) 3.5 m

(SSC Graduate Level Tier-I Exam. 21.04.2013)

56. The difference of perimeter and diameter of a circle is X unit. The diameter of the circle is

(1) $\frac{X}{\pi-1}$ unit (2) $\frac{X}{\pi+1}$ unit

(3) $\frac{X}{\pi}$ unit (4) $\left(\frac{X}{\pi}-1\right)$ unit

(SSC Graduate Level Tier-I Exam. 19.05.2013)

57. The circumference of a circle is 100 cm. The side of a square inscribed in the circle is

(1) $\frac{100\sqrt{2}}{\pi}$ cm (2) $\frac{50\sqrt{2}}{\pi}$ cm

(3) $\frac{100}{\pi}$ cm (4) $50\sqrt{2}$ cm

(SSC CPO S.I. Exam. 12.01.2003 & 09.11.2008)

58. A path of uniform width surrounds a circular park. The difference of internal and external circumference of this circular path is 132 metres. Its width is :

(Take $\pi = \frac{22}{7}$)

(1) 22m (2) 20 m
(3) 21m (4) 24m

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

59. The ratio of the outer and the inner perimeter of a circular path is 23 : 22. If the path is 5 metres wide, the diameter of the inner circle is :

(1) 110 m (2) 55 m
(3) 220 m (4) 230 m

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

60. The radius of the incircle of a triangle is 2 cm. If the area of the triangle is 6 cm², then its perimeter is

(1) 2 cm (2) 3 cm
(3) 6 cm (4) 9 cm

(SSC CPO (SI, ASI & Intelligence Officer) Exam.28.08.2011 (Paper-I)

61. The area of the circumcircle of an equilateral triangle is 3π sq. cm. The perimeter of the triangle is

(1) $3\sqrt{3}$ cm (2) 9 cm
(3) 18 cm (4) 3 cm

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

62. A wire when bent in the form of a square encloses an area of 484 sq. cm. What will be the enclosed area when the same wire is bent into the form of a circle?

(Take $\pi = \frac{22}{7}$)

(1) 462 sq.cm (2) 539 sq.cm
(3) 616 sq.cm (4) 693 sq.cm

(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting) & (SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting, Delhi Zone)

63. Four equal sized maximum circular plates are cut off from a square paper sheet of area 784 sq.cm. The circumference of each plate is (Take $\pi = \frac{22}{7}$)

(1) 22 cm (2) 44 cm
(3) 66 cm (4) 88 cm

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

64. If the area of a circle and a square are equal, then the ratio of their perimeter is

(1) 1 : 1 (2) 2 : π
(3) π : 2 (4) $\sqrt{\pi}$: 2

(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

65. A copper wire is bent in the form of square with an area of 121 cm^2. If the same wire is bent in the form of a circle, the radius (in cm) of the circle is (Take $\pi = \frac{22}{7}$)

(1) 7 (2) 10
(3) 11 (4) 14

(SSC CGL Tier-1 Exam.19.06.2011 (Second Sitting)

66. If the perimeter of a square and a rectangle are the same, then the area P and Q enclosed by them would satisfy the condition

(1) P < Q (2) P $\le$ Q
(3) P > Q (4) P = Q

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

67. A circle and a rectangle have the same perimeter. The sides of the rectangle are 18 cm and 26 cm. The area of the circle is

$\left[\text{Take } \pi = \frac{22}{7}\right]$

(1) 125 cm² (2) 230 cm²
(3) 550 cm² (4) 616 cm²

(SSC Graduate Level Tier-II Exam.16.09.2012)

68. If the sides of an equilateral triangle are increased by 20%, 30% and 50% respectively to form a new triangle, the increase in the perimeter of the equilateral triangle is

(1) 25% (2) $33\frac{1}{3}$%
(3) 75% (4) 100%

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

69. A horse is tied to a post by a rope. If the horse moves along a circular path always keeping the rope stretched and describes 88 metres when it has traced out 72° at the centre, the length of the rope is

$\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 70 m (2) 75 m
(3) 80 m (4) 65 m

(SSC Graduate Level Tier-I Exam. 21.04.2013)

70. Three circles of radii 3.5 cm, 4.5 cm and 5.5 cm touch each other externally. Then the perimeter of the triangle formed by joining the centres of the circles, in cm, is

(1) 27
(2) $\pi[(3.5)^2 + (4.5)^2 + (5.5)^2]$
(3) 27π
(4) 13.5

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

71. ABCD is a parallelogram in which diagonals AC and BD intersect at O. If E, F, G and H are the mid points of AO, DO, CO and BO respectively, then the ratio of the perimeter of the quadrilateral EFGH to the perimeter of parallelogram ABCD is

(1) 1 : 4 (2) 2 : 3
(3) 1 : 2 (4) 1 : 3

(SSC CGL Tier-I Exam. 19.10.2014)

72. A circular wire of diameter 112 cm is cut and bent in the form of a rectangle whose sides are in the ratio of 9 : 7. The smaller side of the rectangle is

(1) 77 cm (2) 97 cm
(3) 67 cm (4) 87 cm

(SSC CGL Tier-I Exam. 26.10.2014)

73. If the perimeter of an equilateral triangle be 18 cm, then the length of each median is

(1) $3\sqrt{2}$ cm (2) $2\sqrt{3}$ cm
(3) $3\sqrt{3}$ cm (4) $2\sqrt{2}$ cm

(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

74. Two equal maximum sized circular plates are cut off from a circular paper sheet of circumference 352 cm. Then the circumference of each circular plate is

(1) 176 cm (2) 150 cm
(3) 165 cm (4) 180 cm

(SSC CHSL DEO & LDC Exam. 16.11.2014)

75. If diagonals of a rhombus are 24 cm and 32 cm, then perimeter of that rhombus is

(1) 80 cm (2) 84 cm
(3) 76 cm (4) 72 cm

(SSC CHSL DEO & LDC Exam. 16.11.2014)

76. The inradius of an equilateral triangle is $\sqrt{3}$ cm, then the perimeter of that triangle is

(1) 18 cm (2) 15 cm
(3) 12 cm (4) 6 cm

(SSC CHSL DEO & LDC Exam. 16.11.2014)

77. Length of a side of a square inscribed in a circle is $a\sqrt{2}$ units. The circumference of the circle is

(1) $2\pi a$ units (2) πa units
(3) $4\pi a$ units (4) $\frac{2a}{\pi}$ units

(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

78. The perimeter and length of a rectangle are 40 m and 12 m respectively. Its breadth will be

(1) 10 m (2) 8 m
(3) 6 m (4) 3 m

(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

79. The difference between the circumference and diameter of a circle is 150 m. The radius of that circle is (Take $\pi = \frac{22}{7}$)

(1) 25 metre (2) 35 metre
(3) 30 metre (4) 40 metre

(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

80. PQRS is a square with side 10 cm. A, B, C and D are mid–points of PQ, QR, RS and SP respectively. Then the perimeter of the square ABCD so formed is

(1) $10\sqrt{2}$ cm (2) $20\sqrt{2}$ cm
(3) $25\sqrt{2}$ cm (4) $15\sqrt{2}$ cm

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

81. A piece of wire when bent to form a circle will have a radius of 84 cm. If the wire is bent to form a square, the length of a side of the square is

(1) 152 cm (2) 132 cm
(3) 168 cm (4) 225 cm

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

82. The perimeters of two similar triangles are 30 cm and 20 cm respectively. If one side of the first triangle is 9 cm. Determine the corresponding side of the second triangle.

(1) 13.5 cm (2) 6 cm
(3) 15 cm (4) 5 cm

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

83. The sides of a triangle having area 7776 sq. cm are in the ratio 3 : 4 : 5. The perimeter of the triangle is

(1) 432 cm (2) 400 cm
(3) 412 cm (4) 424 cm

(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

84. The diameter of each wheel of a car is 70 cm. If each wheel rotates 400 times per minute, then the speed of the car (in km/hr) is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 0.528 (2) 528
(3) 52.8 (4) 5.28

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

85. Quadrilateral ABCD is circumscribed about a circle. If the lengths of AB, BC and CD are 7 cm, 8.5 cm, and 9.2 cm respectively, then the length (in cm) of DA is

(1) 7.7 (2) 16.2
(3) 10.7 (4) 7.2

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

86. The perimeter of a rhombus is 60 cm and one of its diagonal is 24 cm. The area of the rhombus is

(1) 108 sq. cm. (2) 216 sq. cm.
(3) 432 sq. cm. (4) 206 sq. cm.

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

87. The ratio of circumference and diameter of a circle is 22 : 7. If the circumference be $1\frac{4}{7}$ m, then the radius of the circle is :

(1) $\frac{1}{3}$ m (2) $\frac{1}{2}$ m
(3) $\frac{1}{4}$ m (4) 1 m

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

88. Four circles of equal radii are described about the four corners of a square so that each touches two of the other circles. If each side of the square is 140 cm then area of the space enclosed between the circumference of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 4200 cm^2 (2) 2100 cm^2
(3) 7000 cm^2 (4) 2800 cm^2

(SSC CGL Tier-II Online Exam.01.12.2016)

89. The perimeter of a triangle is 67 cm. The first side is twice the length of the second side. The third side is 11 cm more than the second side. Find the length of the shortest side of the triangle.

(1) 12 cm. (2) 14 cm.
(3) 17 cm. (4) 25 cm.

(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

90. The radius of a wheel is 25 cm. How many rounds it will take to complete 11 km.

(1) 5000 (2) 6000
(3) 7000 (4) 4000

(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

91. If the perimeter of circle A is equal to perimeter of semi circle B, what is the ratio of their areas ?

(1) $(\pi+2)^2 : 2\pi^2$

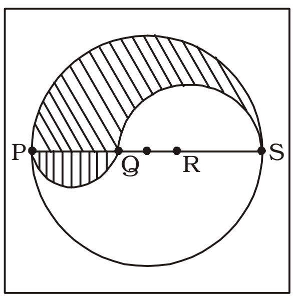
(2) $2\pi^2 : (\pi+2)^2$

(3) $(\pi+2)^2 : 4\pi^2$

(4) $4\pi^2 : (\pi+2)^2$

(SSC CPO Exam. 06.06.2016) (Ist Sitting)

92. PS is a diameter of a circle of radius 6 cm. In the diameter PS, Q and R are two points such that PQ, QR and RS are all equal. Semicircles are drawn on PQ and QS as diameter (as shown in the figure). The perimeter of shaded portion is :



(1) $15\frac{6}{7}$ cm (2) $75\frac{3}{7}$ cm

(3) $37\frac{5}{7}$ cm (4) $18\frac{6}{7}$ cm

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

93. The perimeter of a certain isosceles right triangle is $10+10\sqrt{2}$ cm. What is the length of the hypotenuse of the triangle ?

(1) 5 cm (2) 10 cm

(3) $5\sqrt{2}$ cm (4) $10\sqrt{2}$ cm

(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

94. The radius of wheel moving on a road, is $8\frac{3}{4}$ cm. How many rounds it will take to complete 55 metre distance.

(1) 10 (2) 11

(3) 100 (4) 55

(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

95. The sides of a triangle are in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ and its perimeter is 104 cm. The length of the longest side (in cm) is

(1) 52 (2) 48

(3) 32 (4) 26

(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

96. In an isosceles triangle, the length of each equal side is twice the length of the third side. The ratio of areas of the isosceles triangle and an equilateral triangle with same perimeter is

(1) $30\sqrt{5} : 100$ (2) $32\sqrt{5} : 100$

(3) $36\sqrt{5} : 100$ (4) $42\sqrt{5} : 100$

(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

97. The radius of the incircle of an equilateral ΔABC of side $2\sqrt{3}$ units is x cm. The value of x is :

(1) $\frac{1}{3}$ (2) $\frac{1}{2}$

(3) 1 (4) $\sqrt{3}$

(SSC CGL Tier-I (CBE) Exam. 28.08.2016 (Ist Sitting)

98. The four sides of a quadrilateral are in the ratio of 2 : 3 : 4 : 5 and its perimeter is 280 metre. The length of the longest side is :

(1) 100 metre (2) 150 metre

(3) 175 metre (4) 180 metre

(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IInd Sitting

99. If x is the area, y is the circumference and z is the diameter of circle then the value of $\frac{x}{yz}$ is

(1) 4 : 1 (2) 1 : 4

(3) 1 : 2 (4) 2 : 1

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IInd Sitting)

100. The lengths of diagonals of a rhombus are 24 cm and 10 cm the perimeter of the rhombus (in cm.) is :

(1) 52 (2) 56

(3) 68 (4) 72

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IIIrd Sitting)

101. The length of the base of an isosceles triangle is $2x - 2y + 4z$, and its perimeter is $4x - 2y + 6z$. Then the length of each of the equal sides is

(1) $x + y$ (2) $x + y + z$

(3) $2(x + y)$ (4) $x + z$

(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IInd Sitting)

102. Which of the following ratios can be the ratio of the sides of a right angled triangle?

(1) 9 : 6 : 3 (2) 13 : 12 : 5

(3) 7 : 6 : 5 (4) 5 : 3 : 2

(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IIIrd Sitting)

103. A square playground measures 1127.6164 sq. cm. If a man walks $2\frac{9}{20}$ m a minute, the time taken by him to walk one round around it is approximately.

(1) 50.82 minutes

(2) 54.82 minutes

(3) 54.62 minutes

(4) 50.62 minutes

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–III

1. How many tiles, each 4 decimetre square, will be required to cover the floor of a room 8 m long and 6 m broad ?

(1) 200 (2) 260

(3) 280 (4) 300

(SSC Graduate Level Tier-II Exam. 29.09.2013

2. The floor of a corridor is 100m long and 3 m wide. Cost of covering the floor with carpet 50 cm wide at the rate of ₹ 15 per m is

(1) ₹ 4500 (2) ₹ 9000

(3) ₹ 7500 (4) ₹ 1900

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

3. Three sides of a triangular field are of length 15 m, 20 m and 25 m long respectively. Find the cost of sowing seeds in the field at the rate of 5 rupees per sq.m.

(1) ₹300 (2) ₹600

(3) ₹750 (4) ₹150

(SSC Graduate Level Tier-I Exam. 21.04.2013)

4. The radius of a circular wheel is 1.75 m. The number of revolutions it will make in travelling 11 km is :

$\left(\text{use } \pi = \frac{22}{7}\right)$

(1) 800 (2) 900

(3) 1000 (4) 1200

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

5. The radius of a wheel is 21 cm. How many revolutions will it make in travelling 924 metres ?

$\left(\text{use } \pi = \frac{22}{7}\right)$

(1) 7 (2) 11

(3) 200 (4) 700

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

6. A playground is in the shape of a rectangle. A sum of ₹1,000 was spent to make the ground usable at the rate of 25 paise per sq. m. The breadth of the ground is 50 m. If the length of the ground is increased by 20 m, what will be the expenditure (in rupees) at the same rate per sq. m. ?
(1) 1,250 (2) 1,000
(3) 1,500 (4) 2,250
(SSC Graduate Level Tier-II Exam.16.09.2012)

7. If each edge of a square be doubled, then the increase percentage in its area is
(1) 200% (2) 250%
(3) 280% (4) 300%
(SSC CHSL DEO & LDC Exam. 16.11.2014)

8. If radius of a circle is increased by 5%, then the increase in its area is
(1) 10.25 % (2) 10 %
(3) 5.75 % (4) 5 %
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

9. The height of a triangle is increased by 10%. To retain the original area of the triangle, its corresponding base must be decreased by
(1) 10% (2) $9\frac{1}{7}\%$
(3) $9\frac{1}{8}\%$ (4) $9\frac{1}{11}\%$
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

10. The percentage increase in the area of a rectangle, if each of its sides is increased by 20% is equal to
(1) 32% (2) 34%
(3) 42% (4) 44%
(SSC CGL Tier-I Re-Exam, 30.08.2015)

11. If the radius of a circle is decreased by 10%, then the area of the circle is decreased by
(1) 89% (2) 18%
(3) 19% (4) 25%
(SSC Constable (GD) Exam, 04.10.2015, IInd Sitting)

12. The outer circumference of a circular race-track is 528 metre. The track is everywhere 14 metre wide. Cost of levelling the track at the rate of Rs. 10 per sq. metre is :
(1) Rs. 77660 (2) Rs. 66760
(3) Rs. 76760 (4) Rs. 67760
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

13. If the area of a square is increased by 44%, retaining its shape as a square, each of its sides increases by :
(1) 19% (2) 21%
(3) 22% (4) 20%
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

14. What will be the percentage increase in the area of a square when each of the its sides is increased by 10%?
(1) 20 (2) 11
(3) 121 (4) 21
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

15. If the length and breadth of a rectangle are increased by 10% and 8% respectively, then the area of the rectangle increases by :
(1) $18\frac{7}{5}\%$ (2) $18\frac{4}{5}\%$
(3) 18% (4) $18\frac{1}{5}\%$
(SSC CGL Tier-I (CBE) Exam. 27.10.2016 (Ist Sitting)

TYPE–IV

1. The edges of a rectangular box are in the ratio 1 : 2 : 3 and its surface area is 88 cm^2. The volume of the box is
(1) 24 cm^3 (2) 48 cm^3
(3) 64 cm^3 (4) 120 cm^3
(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

2. A right triangle with sides 3 cm, 4 cm and 5 cm is rotated about the side 3 cm to form a cone, The volume of the cone so formed is
(1) 16 $\pi\,cm^3$ (2) 12 $\pi\,cm^3$
(3) 15 $\pi\,cm^3$ (4) 20 $\pi\,cm^3$
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

3. If the length of each side of a regular tetrahedron is 12 cm, then the volume of the tetrahedron is
(1) $144\sqrt{2}$ cu. cm.
(2) $72\sqrt{2}$ cu. cm.
(3) $8\sqrt{2}$ cu. cm.
(4) $12\sqrt{2}$ cu. cm.
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

4. Two right circular cylinders of equal volume have their heights in the ratio 1 : 2. The ratio of their radii is :
(1) $\sqrt{2}:1$ (2) 2 : 1
(3) 1 : 2 (4) 1 : 4
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

5. The volume of a right circular cylinder whose height is 40cm, and circumference of its base is 66 cm, is :
(1) 55440 cm^3 (2) 3465 cm^3
(3) 7720 cm^3 (4) 13860 cm^3
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

6. The base radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is :
(1) 27 : 20 (2) 20 : 27
(3) 9 : 4 (4) 4 : 9
(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (Ist Sitting)

7. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3.
$\left(\text{Taking } \pi = \frac{22}{7}\right)$. Find the ratio of its diameter to its height.
(1) 7 : 6 (2) 6 : 7
(3) 3 : 7 (4) 7 : 3
(SSC CGL Prelim Exam. 24.02.2002 (IInd Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting) & CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting, East Zone)

8. A hollow cylindrical tube 20 cm long, is made of iron and its external and internal diameters are 8 cm and 6 cm respectively. The volume of iron used in making the tube is (p $= \frac{22}{7}$)
(1) 1760 cu.cm. (2) 880 cu.cm.
(3) 440 cu.cm. (4) 220 cu.cm.
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

9. A hollow iron pipe is 21 cm long and its exterior diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weighs 8 g/cm^3, then the weight of the pipe is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 3.696 kg (2) 3.6 kg
(3) 36 kg (4) 36.9 kg

(SSC CGL Prelim Exam. 08.02.2004 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 04.12.2011)

10. The volume of a right circular cylinder, 14 cm in height, is equal to that of a cube whose edge is 11 cm. Taking $\pi = \frac{22}{7}$ the radius of the base of the cylinder is

(1) 5.2 cm. (2) 5.5 cm.
(3) 11.0 cm. (4) 22.0 cm.

(SSC CPO S.I. Exam. 05.09.2004)

11. If the volume of a right circular cylinder is $9\pi h\ m^3$, where h is its height (in metres) then the diameter of the base of the cylinder is equal to

(1) 3 m (2) 6 m
(3) 9 m (4) 12 m

(SSC CPO S.I. Exam. 05.09.2004)

12. A right circular cylinder of height 16 cm is covered by a rectangular tin foil of size 16 cm × 22 cm. The volume of the cylinder is

(1) 352 cm^3 (2) 308 cm^3
(3) 616 cm^3 (4) 176 cm^3

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

13. The volume of the metal of a cylindrical pipe is 748 cm^3. The length of the pipe is 14cm and its external radius is 9 cm. Its thickness is $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 1 cm (2) 5.2 cm
(3) 2.3 cm (4) 3.7 cm

(SSC CGL Prelim Ex am. 27.07.2008 (First Sitting)

14. Two iron sheets each of diameter 6 cm are immersed in the water contained in a cylindrical vessel of radius 6 cm. The level of the water in the vessel will be raised by

(1) 1 cm (2) 2 cm
(3) 3 cm (4) 6 cm

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

15. The radii of the base of two cylinders A and B are in the ratio 3 : 2 and their height in the ratio n : 1. If the volume of cylinder A is 3 times that of cylinder B, the value of n is

(1) $\frac{4}{3}$ (2) $\frac{2}{3}$
(3) $\frac{3}{4}$ (4) $\frac{3}{2}$

(SSC CPO S.I. Exam. 09.11.2008)

16. Water is being pumped out through a circular pipe whose internal diameter is 7cm. If the flow of water is 12 cm per second, how many litres of water is being pumped out in one hour ?

(1) 1663.2 (2) 1500
(3) 1747.6 (4) 2000

(SSC CPO S.I. Exam. 06.09.2009)

17. The lateral surface area of a cylinder is 1056 cm^2 and its height is 16cm. Find its volume.

(1) 4545 cm^3 (2) 4455 cm^3
(3) 5445 cm^3 (4) 5544 cm^3

(SSC CPO S.I. Exam. 06.09.2009)

18. A cylinder has 'r' as the radius of the base and 'h' as the height. The radius of base of another cylinder, having double the volume but the same height as that of the first cylinder must be equal to

(1) $\frac{r}{\sqrt{2}}$ (2) $2r$
(3) $r\sqrt{2}$ (4) $\sqrt{2r}$

FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

19. The diameter of two cylinders, whose volumes are equal, are in the ratio 3 : 2. Their heights will be in the ratio .

(1) 4 : 9 (2) 5 : 6
(3) 5 : 8 (4) 8 : 9

(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

20. From a solid cylinder of height 10 cm and radius of the base 6 cm, a cone of same height and same base is removed. The volume of the remaining solid is :

(1) 240 π cu.cm (2) 5280 cu.cm
(3) 620 π cu.cm (4) 360 π cu.cm

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

21. From a solid cylinder whose height is 12 cm and diameter 10cm, a conical cavity of same height and same diameter of the base is hollowed out. The volume of the remaining solid is approximately $\left(\pi = \frac{22}{7}\right)$

(1) 942.86 cm^3 (2) 314.29 cm^3
(3) 628.57 cm^3 (4) 450.76 cm^3

(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (IInd Sitting)

22. The radius of a cylinder is 10 cm and height is 4 cm. The number of centimetres that may be added either to the radius or to the height to get the same increase in the volume of the cylinder is

(1) 5 cm (2) 4 cm
(3) 25 cm (4) 16 cm

(SSC Graduate Level Tier-II Exam.16.09.2012)

23. The radii of the base of a cylinder and a cone are in the ratio $\sqrt{3} : \sqrt{2}$ and their heights are in the ratio $\sqrt{2} : \sqrt{3}$. Their volumes are in the ratio of

(1) $\sqrt{3} : \sqrt{2}$ (2) $3\sqrt{3} : \sqrt{2}$
(3) $\sqrt{3} : 2\sqrt{2}$ (4) $\sqrt{2} : \sqrt{6}$

(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

24. The curved surface area and the total surface area of a cylinder are in the ratio 1 : 2. If the total surface area of the right cylinder is 616 cm^2, then its volume is :

(1) 1232 cm^3 (2) 1848 cm^3
(3) 1632 cm^3 (4) 1078 cm^3

(SSC Graduate Level Tier-I Exam. 21.04.2013)

25. The perimeter of the base of a right circular cylinder is 'a' unit. If the volume of the cylinder is V cubic unit, then the height of the cylinder is

(1) $\frac{4a^2V}{\pi}$ unit (2) $\frac{4\pi a^2}{V}$ unit
(3) $\frac{\pi a^2 V}{4}$ unit (4) $\frac{4\pi V}{a^2}$ unit

(SSC Graduate Level Tier-I Exam. 19.05.2013)

26. What is the height of a cylinder that has the same volume and radius as a sphere of diameter 12 cm ?

(1) 7 cm (2) 10 cm
(3) 9 cm (4) 8 cm

(SSC CHSL DEO & LDC Exam. 20.10.2013)

27. If diagonal of a cube is $\sqrt{12}$ cm, then its volume in cubic cm is :

(1) 8 (2) 12
(3) 24 (4) $\sqrt[3]{2}$

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

28. If the volume of two cubes are in the ratio 27:1, the ratio of their edge is :

(1) 3 : 1 (2) 27:1
(3) 1:3 (4) 1:27

(SSC CGL Prelim Exam. 04.07.1999 (IInd Sitting) & (SSC S.O. Commercial Audit Exam. 16.11.2003)

29. The edges of a cuboid are in the ratio 1 : 2 : 3 and its surface area is 88cm^2. The volume of the cuboid is :

(1) 120 cm^3 (2) 64 cm^3
(3) 48 cm^3 (4) 24 cm^3

(SSC CGL Prelim Exam. 04.07.1999 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 28.10.2012)

30. What is the volume of a cube (in cubic cm) whose diagonal measures $4\sqrt{3}$ cm?

(1) 16 (2) 27
(3) 64 (4) 8

(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & (SSC CPO S.I. Exam. 03.09.2006)

31. A cuboidal water tank has 216 litres of water. Its depth is $\frac{1}{3}$ of its length and breadth is $\frac{1}{2}$ of $\frac{1}{3}$ of the difference of length and breadth. The length of the tank is

(1) 72 dm (2) 18 dm
(3) 6 dm (4) 2 dm

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

32. A wooden box measures 20 cm by 12 cm by 10 cm. Thickness of wood is 1 cm. Volume of wood to make the box (in cubic cm) is

(1) 960 (2) 519
(3) 2400 (4) 1120

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

33. The area of three adjacent faces of a cuboid are x, y, z square units respectively. If the volume of the cuboid be y cubic units, then the correct relation between v, x, y, z is

(1) $v^2 = xyz$ (2) $v^3 = xyz$
(3) $v^2 = x^3y^3z^3$ (4) $v^3 = x^2y^2z^2$

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

34. Water flows into a tank which is 200m long and 150m wide, through a pipe of cross-section 0.3m × 0.2m at 20 km/hour. Then the time (in hours) for the water level in the tank to reach 8m is

(1) 50 (2) 120
(3) 150 (4) 200

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

35. A rectangular sheet of metal is 40cm by 15cm. Equal squares of side 4cm are cut off at the corners and the remainder is folded up to form an open rectangular box. The volume of the box is

(1) 896 cm^3 (2) 986 cm^3
(3) 600 cm^3 (4) 916 cm^3

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

36. The areas of three consecutive faces of a cuboid are 12 cm^2, 20 cm^2 and 15 cm^2, then the volume (in cm^3) of the cuboid is

(1) 3600 (2) 100
(3) 80 (4) 60

(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

37. Surface areas of three adjacent faces of a cuboid are p, q, r. Its volume is

(1) $\sqrt{pq^2 + qr^2 + rp^2}$

(2) $\left(\sqrt{pq} + \sqrt{qr} + \sqrt{rp}\right)\left(p^2 + q^2 + r^2\right)$

(3) $\left(\sqrt{\left(p^2 + q^2 + r^2\right)(p + q + r)}\right)$

(4) $\sqrt{pqr}$

(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

38. A godown is 15 m long and 12 m broad. The sum of the area of the floor and the ceiling is equal to the sum of areas of the four walls. The volume (in m^3) of the godown is:

(1) 900 (2) 1200
(3) 1800 (4) 720

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

39. If the total surface area of a cube is 96 cm^2, its volume is

(1) 56 cm^3 (2) 16 cm^3
(3) 64 cm^3 (4) 36 cm^3

(SSC CHSL DEO & LDC Exam. 20.10.2013)

40. The ratio of the volume of two cones is 2 : 3 and the ratio of radii of their base is 1 : 2. The ratio of their height is

(1) 3 : 8 (2) 8 : 3
(3) 4 : 3 (4) 3 : 4

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CPO S.I. Exam. 03.09.2006) & (SSC CHSL DEO & LDC Exam. 10.11.2013)

41. If the height of a given cone be doubled and radius of the base remains the same, the ratio of the volume of the given cone to that of the second cone will be

(1) 2 : 1 (2) 1 : 8
(3) 1 : 2 (4) 8 : 1

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

42. If the radius of the base of a cone be doubled and height is left unchanged, then ratio of the volume of new cone to that of the original cone will be :

(1) 1 : 4 (2) 2 : 1
(3) 1 : 2 (4) 4 : 1

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

43. Each of the measure of the radius of base of a cone and that of a sphere is 8 cm. Also, the volume of these two solids are equal. The slant height of the cone is

(1) $8\sqrt{17}$ cm (2) $4\sqrt{17}$ cm
(3) $34\sqrt{2}$ cm (4) 34 cm.

(SSC CPO S.I. Exam. 05.09.2004)

44. A cone of height 15 cm and basediameter 30 cm is carved out of a wooden sphere of radius 15 cm. The percentage of wasted wood is :

(1) 75% (2) 50%
(3) 40% (4) 25%

(SSC CPO S.I. Exam. 26.05.2005)

45. In a right circular cone, the radius of its base is 7 cm and its height 24 cm. A cross-section is made through the midpoint of the height parallel to the base. The volume of the upper portion is

(1) 169 cm^3 (2) 154 cm^3
(3) 1078 cm^3 (4) 800 cm^3

(SSC Section Officer (Commercial Audit) Exam.26.11.2006 (Second Sitting)

46. If the area of the base of a cone is 770 cm^2 and the area of the curved surface is 814 cm^2, then its volume (in cm^3) is :

(1) $213\sqrt{5}$ (2) $392\sqrt{5}$
(3) $550\sqrt{5}$ (4) $616\sqrt{5}$

(SSC CPO S.I. Exam. 16.12.2007)

47. Volume of two cones are in the ratio 1 : 4 and their diameters are in the ratio 4 : 5. The ratio of their height is

(1) 1 : 5 (2) 5 : 4
(3) 5 : 16 (4) 25 : 64

(SSC CPO S.I. Exam. 06.09.2009)

48. The height of the cone is 30 cm. A small cone is cut off at the top by a plane parallel to its base. If its volume is $\frac{1}{27}$ of the volume of the cone, at what height, above the base, is the section made?

(1) 6 cm (2) 8 cm
(3) 10 cm (4) 20 cm

(SSC Data Entry Operator Exam. 31.08.2008)

49. The radius of the base and height of a right circular cone are in the ratio 5 : 12. If the volume of the cone is $314\frac{2}{7}$ cm^3, the slant height (in cm) of the cone will be

(1) 12 (2) 13
(3) 15 (4) 17

(SSC Data Entry Operator Exam. 02.08.2009)

50. Two solid right cones of equal height and of radii r_1 and r_2 are melted and made to form a solid sphere of radius R. Then the height of the cone is

(1) $\frac{4R^2}{r_1^2+r_2^2}$ (2) $\frac{4R}{r_1+r_2}$
(3) $\frac{4R^3}{r_1^2+r_2^2}$ (4) $\frac{R^2}{r_1^2+r_2^2}$

(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

51. The ratio of radii of two cone is 3 : 4 and the ratio of their height is 4 : 3. Then the ratio of their volume will be

(1) 3 : 4 (2) 4 : 3
(3) 9 : 16 (4) 16 : 9

(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

52. If a right circular cone is separated into solids of volumes V_1, V_2, V_3 by two planes parallel to the base, which also trisect the altitude, then $V_1 : V_2 : V_3$ is

(1) 1: 2 : 3 (2) 1: 4 : 6
(3) 1: 6 : 9 (4) 1: 7 : 19

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

53. If the radii of the circular ends of a truncated conical bucket which is 45cm high be 28 cm and 7 cm, then the capacity of the bucket in cubic centimetre is $\left(use\,\pi = \frac{22}{7}\right)$

(1) 48510 (2) 45810
(3) 48150 (4) 48051

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

54. The ratio of height and the diameter of a right circular cone is 3 : 2 and its volume is 1078 cc, then (taking $\pi = \frac{22}{7}$) its height is :

(1) 7 cm (2) 14 cm
(3) 21 cm (4) 28 cm

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

55. The radius of the base of a right circular cone is doubled keeping its height fixed. The volume of the cone will be :

(1) three times of the previous volume
(2) four times of the previous volume
(3) $\sqrt{2}$ times of the previous volume
(4) double of the previous volume

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

56. The heights of two cones are in the ratio 1 : 3 and the diameters of their base are in the ratio 3 : 5. The ratio of their volume is

(1) 3 : 25 (2) 4 : 25
(3) 6 : 25 (4) 7 : 25

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

57. The base of a right circular cone has the same radius a as that of a sphere. Both the sphere and the cone have the same volume. Height of the cone is

(1) $3a$ (2) $4a$
(3) $\frac{7}{4}a$ (4) $\frac{7}{3}a$

(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

58. The circumference of the base of a 16cm height solid cone is 33cm. What is the volume of the cone in cm^3 ?

(1) 1028 (2) 616
(3) 462 (4) 828

(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

59. The perimeter of the base of a right circular cone is 8 cm. If the height of the cone is 21 cm, then its volume is:

(1) 108 π cm^3 (2) $\frac{112}{\pi}$ cm^3
(3) 112 π cm^3 (4) $\frac{108}{\pi}$ cm^3

(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

60. If the volume of two right circular cones are in the ratio 4 : 1 and their diameter are in the ratio 5 : 4, then the ratio of their height is :

(1) 25 :16 (2) 25 : 64
(3) 64 : 25 (4) 16 : 25

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

61. The volume of a conical tent is 1232 cu. m and the area of its base is 154 sq. m. Find the length of the canvas required to build the tent, if the canvas is 2m in width. $\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 270 m (2) 272 m
(3) 276 m (4) 275 m

(SSC Graduate Level Tier-II Exam. 29.09.2013)

62. If the ratio of the diameters of two right circular cones of equal height be 3 : 4, then the ratio of their volume will be
(1) 3 : 4 (2) 9 : 16
(3) 16 : 9 (4) 27 : 64
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

63. A hollow spherical metallic ball has an external diameter 6 cm and is $\frac{1}{2}$ cm thick. The volume of the ball (in cm^3) is $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) $41\frac{2}{3}$ (2) $37\frac{2}{3}$
(3) $47\frac{2}{3}$ (4) $40\frac{2}{3}$
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

64. The sum of radii of two spheres is 10 cm and the sum of their volume is 880 cm^3. What will be the product of their radii ?
(1) 21 (2) $26\frac{1}{3}$
(3) $33\frac{1}{3}$ (4) 70
(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

65. If the radius of a sphere is doubled, its volume becomes
(1) double (2) four times
(3) six times (4) eight times
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

66. The radii of two spheres are in the ratio 3 : 2. Their volume will be in the ratio :
(1) 9 : 4 (2) 3 : 2
(3) 8 : 27 (4) 27 : 8
(SSC CPO S.I. Exam. 16.12.2007)

67. The total surface area of a solid hemisphere is 108π cm^2. The volume of the hemisphere is
(1) 72π cm^3 (2) 144π cm^3
(3) $108\sqrt{6}$ cm^3 (4) $54\sqrt{6}$ cm^3
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

68. The largest sphere is carved out of a cube of side 7 cm. The volume of the sphere (in cm^3) will be
(1) 718.66 (2) 543.72
(3) 481.34 (4) 179.67
(SSC CPO S.I. Exam. 06.09.2009)

69. The surface areas of two spheres are in the ratio 4 : 9. Their volumes will be in the ratio
(1) 2 : 3 (2) 4 :9
(3) 8 : 27 (4) 64 : 729
(SSC Data Entry Operator Exam. 31.08.2008) & (SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting) & (SSC GL Tier-II Exam. 29.09.2013)

70. A sphere and a hemisphere have the same volume. The ratio of their radii is
(1) 1 : 2 (2) 1 : 8
(3) 1 : $\sqrt{2}$ (4) 1 : $\sqrt[3]{2}$
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

71. A solid sphere of 6 cm diameter is melted and recast into 8 solid spheres of equal volume. The radius (in cm) of each small sphere is
(1) 1.5 (2) 3
(3) 2 (4) 2.5
(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

72. The total surface area of a sphere is 8π square unit. The volume of the sphere is
(1) $\frac{8\sqrt{2}}{3}\pi$ cubic unit
(2) $\frac{8}{3}\pi$ cubic unit
(3) $8\sqrt{3}\pi$ cubic unit
(4) $\frac{8\sqrt{3}}{5}\pi$ cubic unit
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

73. Area of the base of a pyramid is 57 sq.cm. and height is 10 cm, then its volume (in cm^3), is
(1) 570 (2) 390
(3) 190 (4) 590
FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

74. There is a pyramid on a base which is a regular hexagon of side 2a cm. If every slant edge of this pyramid is of length $\frac{5a}{2}$ cm, then the volume of this pyramid is
(1) $3a^3$ cm^3 (2) $3\sqrt{2}\,a^3$ cm^3
(3) $3\sqrt{3}\,a^3$ cm^3 (4) $6a^3$ cm^3
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

75. The base of a right pyramid is a square of side 40 cm long. If the volume of the pyramid is 8000 cm^3, then its height is :
(1) 5 cm (2) 10 cm
(3) 15 cm (4) 20 cm
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

76. The base of a right prism is a trapezium. The length of the parallel sides are 8 cm and 14 cm and the distance between the parallel sides is 8 cm. If the volume of the prism is 1056 cm^3, then the height of the prism is
(1) 44 cm (2) 16.5 cm
(3) 12 cm (4) 10.56 cm
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

77. The height of a right prism with a square base is 15 cm. If the area of the total surface of the prism is 608 sq. cm, its volume is
(1) 910 cm^3 (2) 920 cm^3
(3) 960 cm^3 (4) 980 cm^3
(SSC Graduate Level Tier-II Exam.16.09.2012)

78. The base of a right prism is an equilateral triangle of side 8 cm and height of the prism is 10 cm. Then the volume of the prism is
(1) $320\sqrt{3}$ cubic cm
(2) $160\sqrt{3}$ cubic cm
(3) $150\sqrt{3}$ cubic cm
(4) $300\sqrt{3}$ cubic cm
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

79. The base of right prism is a triangle whose perimeter is 28 cm and the inradius of the triangle is 4 cm. If the volume of the prism is 366 cc, then its height is
(1) 6 cm (2) 8 cm
(3) 4 cm (4) None of these
(SSC CHSL DEO & LDC Exam. 20.10.2013)

80. If the base of a right pyramid is triangle of sides 5 cm, 12 cm, 13 cm and its volume is 330 cm^3, then its height (in cm) will be
(1) 33 (2) 32
(3) 11 (4) 22
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

81. The diameter of the moon is assumed to be one fourth of the diameter of the earth. Then the ratio of the volume of the earth to that of the moon is

(1) 64 : 1 (2) 1 : 64
(3) 60 : 7 (4) 7 : 60

(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

82. A conical vessel whose internal radius is 12 cm and height 50 cm is full of liquid. The contents are emptied into a cylindrical vessel with radius (internal) 10 cm. The height to which the liquid rises in the cylindrical vessel is :

(1) 25cm (2) 20cm
(3) 24cm (4) 22cm

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

83. The volume of a right circular cylinder is equal to the volume of that right circular cone whose height is 108 cm and diameter of base is 30 cm. If the height of the cylinder is 9 cm, the diameter of its base is

(1) 30 cm (2) 60 cm
(3) 50 cm (4) 40 cm

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

84. The total surface area of a cube and a sphere are equal. What will be the ratio between their volume ?

(1) $\pi : 6$ (2) $\sqrt{\pi} : \sqrt{6}$

(3) $\sqrt{6} : \sqrt{\pi}$ (4) $6 : \pi$

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005) & (SSC HSGL Data Entry & LDC Exam. 28.11.2010 (Ist Sitting) & (SSC MTS (Non-Technical Staff Exam. 20.02.2011)

85. A rectangular paper sheet of dimensions 22 cm × 12 cm is folded in the form of a cylinder along its length. What will be the volume of this cylinder ? (Take $\pi = \frac{22}{7}$)

(1) 460 cm^3 (2) 462 cm^3
(3) 624 cm^3 (4) 400 cm^3

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

86. The ratio of the volume of a cube to that of a sphere, which will fit exactly inside the cube, is

(1) $\pi : 6$ (2) $6 : \pi$
(3) $3 : \pi$ (4) $\pi : 3$

(SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting) & (SSC CGL Prelim Exam. 27.07.2008 (Ist Sitting)

87. The volume of a sphere and a right circular cylinder having the same radius are equal , The ratio of the diameter of the sphere to the height of the cylinder is

(1) 3 : 2 (2) 2 : 3
(3) 1 : 2 (4) 2 : 1

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

88. The size of a rectangular piece of paper is 100 cm × 44 cm. A cylinder is formed by rolling the paper along its length. The volume of the cylinder is (Use $\pi = \frac{22}{7}$)

(1) 4400 cm^3 (2) 15400 cm^3
(3) 35000 cm^3 (4) 144 cm^3

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

89. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. The ratio of their respective volume is

(1) 1 : 2 : 3 (2) 2 : 1 : 3
(3) 1 : 3 : 2 (4) 3 : 1 : 2

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 11.12.2011 (Delhi Zone) & (FCI Asst. Grade-III Exam. 25.02.2012 (Paper-I, North Zone, Ist Sitting)

90. The height of a cylinder and that of a cone are in the ratio 2 : 3 and the radii of their bases in the ratio 3 : 4. The ratio of their volume will be

(1) 1 : 9 (2) 2 : 9
(3) 9 : 8 (4) 3 : 8

(SSC CPO S.I. Exam. 09.11.2008)

91. Water is flowing at the rate of 5 km/h through a pipe of diameter 14 cm into a rectangular tank which is 50 m long, 44m wide. The time taken (in hours) for the rise in the level of water in the tank to be 7 cm is

(1) 2 (2) $1\frac{1}{2}$

(3) 3 (4) $2\frac{1}{2}$

(SSC CPO S.I. Exam. 06.09.2009 & (SSC CGL Tier-1 Exam. 19.06.2011 (IInd Sitting)

92. The total surface area of a solid right circular cylinder is twice that of a solid sphere. If they have the same radii, the ratio of the volume of the cylinder to that of the sphere is given by

(1) 9 : 4 (2) 2 : 1
(3) 3 : 1 (4) 4 : 9

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

93. In a cylindrical vessel of diameter 24 cm filled up with sufficient quantity of water, a solid spherical ball of radius 6 cm is completely immersed. Then the increase in height of water level is :

(1) 1.5 cm (2) 2 cm
(3) 3 cm (4) 4.2 cm

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

94. A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy (nearly).

(1) 104 cm^3 (2) 162 cm^3
(3) 427 cm^3 (4) 266 cm^3

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

95. The respective height and volume of a hemisphere and a right circular cylinder are equal, then the ratio of their radii is

(1) $\sqrt{2} : \sqrt{3}$ (2) $\sqrt{3} : 1$

(3) $\sqrt{3} : \sqrt{2}$ (4) $2 : \sqrt{3}$

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

96. The ratio of the volume of a cube and of a solid sphere is 363 : 49. The ratio of an edge of the cube and the radius of the sphere is (taking $\pi = \frac{22}{7}$)

(1) 7 : 11 (2) 22 : 7
(3) 11 : 7 (4) 7: 22

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

97. From a right circular cylinder of radius 10 cm and height 21 cm, a right circular cone of same base-radius is removed. If the volume of the remaining portion is 4400 cm^3, then the height of the removed cone (taking $\pi = \frac{22}{7}$) is :

(1) 15 cm (2) 18 cm
(3) 21 cm (4) 24 cm

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

98. If a solid cone of volume 27π cm^3 is kept inside a hollow cylinder whose radius and height are that of the cone, then the volume of water needed to fill the empty space is

(1) 3π cm^3 (2) 18π cm^3
(3) 54π cm^3 (4) 81π cm^3

(SSC Graduate Level Tier-II Exam.16.09.2012)

99. A cylindrical can whose base is horizontal and is of internal radius 3.5 cm contains sufficient water so that when a solid sphere is placed inside, water just covers the sphere. The sphere fits in the can exactly. The depth of water in the can before the sphere was put, is

(1) $\frac{35}{3}$ cm (2) $\frac{17}{3}$ cm
(3) $\frac{7}{3}$ cm (4) $\frac{14}{3}$ cm

(SSC Graduate Level Tier-II Exam.16.09.2012)

100. If A denotes the volume of a right circular cylinder of same height as its diameter and B is the volume of a sphere of same radius, then $\frac{A}{B}$ is :

(1) $\frac{4}{3}$ (2) $\frac{3}{2}$
(3) $\frac{2}{3}$ (4) $\frac{3}{4}$

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

101. The base of a right circular cone has the same radius a as that of a sphere. Both the sphere and the cone have the same volume. Height of the cone is

(1) $3a$ (2) $4a$
(3) $\frac{7}{4}a$ (4) $\frac{7}{3}a$

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

102. The radii of the base of a cylinder and a cone are in the ratio $\sqrt{3}:\sqrt{2}$ and their heights are in the ratio $\sqrt{2}:\sqrt{3}$. Their volume are in the ratio of

(1) $\sqrt{3}:\sqrt{2}$ (2) $3\sqrt{3}:\sqrt{2}$
(3) $\sqrt{3}:2\sqrt{2}$ (4) $\sqrt{2}:\sqrt{6}$

(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

103. A semicircular sheet of metal of diameter 28 cm is bent into an open conical cup. The capacity of the cup (taking $\pi = \frac{22}{7}$) is

(1) 624.26 cm^3 (2) 622.38 cm^3
(3) 622.56 cm^3 (4) 623.20 cm^3

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

104. A conical flask is full of water. The flask has base radius r and height h. This water is poured into a cylindrical flask of base radius m. The height of water in the cylindrical flask is

(1) $\frac{m}{2h}$ (2) $\frac{h}{2}m^2$
(3) $\frac{2h}{m}$ (4) $\frac{h}{3m^2}$

(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

105. The volume of a cylinder and a cone are in the ratio 3 : 1. Find their diameters and then compare them when their heights are equal.

(1) Diameter of cylinder = 2 times of diameter of cone
(2) Diameter of cylinder = Diameter of cone
(3) Diameter of cylinder > Diameter of cone
(4) Diameter of cylinder < Diameter of cone

(SSC CHSL DEO & LDC Exam. 20.10.2013)

106. A cone of height 7 cm and base radius 1 cm is carved from a cuboidal block of wood 10 cm × 5cm × 2 cm. [Assuming $\pi = \frac{22}{7}$] The percentage wood wasted in the process is :

(1) $92\frac{2}{3}\%$ (2) $46\frac{1}{3}\%$
(3) $53\frac{2}{3}\%$ (4) $7\frac{1}{3}\%$

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

107. If the radius of a cylinder is decreased by 50% and the height is increased by 50% to form a new cylinder, the volume will be decreased by

(1) 0% (2) 25%
(3) 62.5% (4) 75%

(SSC CPO S.I. Exam. 07.09.2003)

108. Each of the height and base-radius of a cone is increased by 100%. The percentage increase in the volume of the cone is

(1) 700% (2) 400%
(3) 300% (4) 100%

(SSC CPO S.I. Exam. 07.09.2003)

109. If both the radius and height of a right circular cone are increased by 20%, its volume will be increased by

(1) 20% (2) 40%
(3) 60% (4) 72.8%

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

110. If the height of a right circular cone is increased by 200% and the radius of the base is reduced by 50%, the volume of the cone

(1) increases by 25%
(2) increases by 50%
(3) remains unaltered
(4) decreases by 25%

(SSC CPO S.I. Exam. 03.09.2006)

111. If the height and the radius of the base of a cone are each increased by 100%, then the volume of the cone becomes

(1) double that of the original
(2) three times that of the original
(3) six times that of the original
(4) eight times that of the original

(SSC CPO S.I. Exam. 03.09.2006)

112. If the radius of a right circular cylinder is decreased by 50% and its height is increased by 60%, its volume will be decreased by

(1) 10% (2) 60%
(3) 40% (4) 20%

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

113. The length, breadth and height of a cuboid are in the ratio 1 : 2 : 3. If they are increased by 100%, 200% and 200% respectively, then compared to the original volume the increase in the volume of the cuboid will be

(1) 5 times (2) 18 times
(3) 12 times (4) 17 times

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

114. Each of the radius of the base and the height of a right circular cylinder is increased by 10%. The volume of the cylinder is increased by
(1) 3.31% (2) 14.5%
(3) 33.1% (4) 19.5%
(SSC CPO S.I. Exam. 09.11.2008) & (SSC SAS Exam. 26.06.2010 (Paper-I)

115. If the height of a cone is increased by 100% then its volume is increased by :
(1) 100% (2) 200%
(3) 300% (4) 400%
(SSC CHSL DEO & LDC Exam. 27.11.2010)

116. A hemispherical cup of radius 4 cm is filled to the brim with coffee. The coffee is then poured into a vertical cone of radius 8 cm and height 16 cm. The percentage of the volume of the cone that remains empty is :
(1) 87.5% (2) 80.5%
(3) 81.6% (4) 88.2%
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

117. The volume (in m^3) of rain water that can be collected from 1.5 hectares of ground in a rainfall of 5 cm is
(1) 75 (2) 750
(3) 7500 (4) 75000
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

118. Each edge of a regular tetrahedron is 3 cm, then its volume is
(1) $\frac{9\sqrt{2}}{4}$ c.c. (2) $27\sqrt{3}$ c.c.
(3) $\frac{4\sqrt{2}}{9}$ c.c. (4) $9\sqrt{3}$ c.c.
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

119. The perimeter of the triangular base of a right prism is 15 cm and radius of the incircle of the triangular base is 3 cm. If the volume of the prism be 270 cm^3, then the height of the prism is
(1) 6 cm (2) 7·5 cm
(3) 10 cm (4) 12 cm
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

120. A prism has as the base a right-angled triangle whose sides adjacent to the right angles are 10 cm and 12 cm long. The height of the prism is 20 cm. The density of the material of the prism is 6 gm/cubic cm. The weight of the prism is
(1) 6.4 kg (2) 7.2 kg
(3) 3.4 kg (4) 4.8 kg
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

121. A copper rod of 1 cm diameter and 8 cm length is drawn into a wire of uniform diameter and 18 m length. The radius (in cm) of the wire is
(1) $\frac{1}{15}$ (2) $\frac{1}{30}$
(3) $\frac{2}{15}$ (4) 15
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

122. A well 20 m in diameter is dug 14 m deep and the earth taken out is spread all around it to a width of 5 m to form an embankment. The height of the embankment is :
(1) 10 m (2) 11 m
(3) 11.2 m (4) 11.5 m
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

123. Two solid cylinders of radii 4 cm and 5cm and length 6 cm and 4 cm respectively are recast into cylindrical disc of thickness1 cm. The radius of the disc is
(1) 7 cm (2) 14 cm
(3) 21 cm (4) 28 cm
(SSC CPO S.I. Exam. 06.09.2009)

124. A metallic hemisphere is melted and recast in the shape of a cone with the same base radius (R) as that of the hemisphere. If H is the height of the cone, then :
(1) H = 2R (2) $H = \frac{2}{3}R$
(3) $H = \sqrt{3R}$ (4) B = 3R
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

125. Three solid metallic spheres of diameter 6 cm, 8 cm and 10 cm are melted and recast into a new solid sphere. The diameter of the new sphere is :
(1) 4 cm (2) 6 cm
(3) 8 cm (4) 12 cm
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

126. Three solid metallic balls of radii 3 cm, 4 cm and 5 cm are melted and moulded into a single solid ball. The radius of the new ball is :
(1) 2 cm (2) 3 cm
(3) 4 cm (4) 6 cm
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

127. Three solid spheres of a metal whose radii are 1 cm, 6 cm and 8 cm are melted to form an other solid sphere. The radius of this new sphere is
(1) 10.5 cm (2) 9.5 cm
(3) 10 cm (4) 9 cm
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

128. A sphere of radius 2 cm is put into water contained in a cylinder of base-radius 4 cm. If the sphere is completely immersed in the water, the water level in the cylinder rises by
(1) $\frac{1}{3}$ cm (2) $\frac{1}{2}$ cm
(3) $\frac{2}{3}$ cm (4) 2 cm
(SSC CPO S.I. Exam. 07.09.2003)

129. 12 spheres of the same size are made by melting a solid cylinder of 16 cm diameter and 2 cm height. The diameter of each sphere is :
(1) 2 cm (2) 4 cm
(3) 3 cm (4) $\sqrt{3}$ cm
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

130. By melting a solid lead sphere of diameter 12 cm, three small spheres are made whose diameters are in the ratio 3 : 4 : 5. The radius (in cm) of the smallest sphere is
(1) 3 (2) 6
(3) 1.5 (4) 4
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

131. A solid metallic sphere of radius 3 decimetres is melted to form a circular sheet of 1 milimetre thickness. The diameter of the sheet so formed is
(1) 26 metres (2) 24 metres
(3) 12 metres (4) 6 metres
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

132. A copper wire of length 36 m and diameter 2 mm is melted to form a sphere. The radius of the sphere (in cm) is
(1) 2.5 (2) 3
(3) 3.5 (4) 4
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

133. A child reshapes a cone made up of clay of height 24cm and radius 6cm into a sphere. The radius (in cm) of the sphere is
(1) 6 (2) 12
(3) 24 (4) 48
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

134. A solid metallic spherical ball of diameter 6 cm is melted and recasted into a cone with diameter of the base as 12 cm. The height of the cone is
(1) 6 cm (2) 2 cm
(3) 4 cm (4) 3 cm
(SSC CPO S.I. Exam. 12.01.2003)

135. The diameter of the iron ball used for the shot-put game is 14 cm. It is melted and then a solid cylinder of height $2\frac{1}{3}$ cm is made. What will be the diameter of the base of the cylinder ?
(1) 14 cm (2) 28 cm
(3) $\frac{14}{3}$ cm (4) $\frac{28}{3}$ cm
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

136. The radius of the base and height of a metallic solid cylinder are *r* cm and 6 cm respectively. It is melted and recast into a solid cone of the same radius of base, The height of the cone is :
(1) 54 cm (2) 27 cm
(3) 18 cm (4) 9 cm
(SSC CPO S.I. Exam. 16.12.2007)

137. A solid metallic cone is melted and recast into a solid cylinder of the same base as that of the cone. If the height of the cylinder is 7cm, the height of the cone was
(1) 20 cm (2) 21 cm
(3) 28 cm (4) 24 cm
(SSC Data Entry Operator Exam. 02.08.2009)

138. A solid spherical copper ball, whose diameter is 14 cm, is melted and converted into a wire having diameter equal to 14 cm. The length of the wire is
(1) 27 cm (2) $\frac{16}{3}$ cm
(3) 15 cm (4) $\frac{28}{3}$ cm
(SSC Constable (GD) Exam. 12.05.2013 Ist Sitting)

139. A solid sphere is melted and recast into a right circular cone with a base radius equal to the radius of sphere. What is the ratio of the height and radius of the cone so formed?
(1) 4:3 (2) 2:3
(3) 3 : 4 (4) 4 :1
(SSC Constable (GD) Exam. 12.05.2013)

140. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is just completely submerged in water, then the rise of water level in the cylindrical vessel is
(1) 2 cm (2) 1 cm
(3) 3 cm (4) 4 cm
(SSC Graduate Level Tier-I Exam. 19.05.2013)

141. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. The length of the wire, in metre, is :
(1) 2.43 (2) 243
(3) 2430 (4) 24.3
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

142. A rectangular block of metal has dimensions 21 cm, 77 cm and 24 cm. The block has been melted into a sphere. The radius of the sphere is
$\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 21 cm (2) 7 cm
(3) 14 cm (4) 28 cm
(SSC Graduate Level Tier-II Exam. 29.09.2013

143. The radius of cross-section of a solid cylindrical rod of iron is 50 cm. The cylinder is melted down and formed into 6 solid spherical balls of the same radius as that of the cylinder. The length of the rod (in metres) is
(1) 0.8 (2) 2
(3) 3 (4) 4
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

144. Two right circular cones of equal height of radii of base 3 cm and 4 cm are melted together and made to a solid sphere of radius 5 cm. The height of a cone is
(1) 10 cm (2) 20 cm
(3) 30 cm (4) 40 cm
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

145. A tank 40 m long, 30 m broad and 12 m deep is dug in a field 1000 m long and 30 m wide. By how much will the level of the field rise if the earth dug out of the tank is evenly spread over the field ?
(1) 2 metre (2) 1.2 metre
(3) 0.5 metre (4) 5 metre
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

146. A right pyramid 6 m hight has a square base of which the diagonal is $\sqrt{1152}$ m. Volume of the pyramid is
(1) 144 m^3 (2) 288 m^3
(3) 576 m^3 (4) 1152 m^3
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

147. If the ratio of volumes of two cones is 2 : 3 and the ratio of the radii of their bases is 1 : 2, then the ratio of their heights will be
(1) 8 : 3 (2) 3 : 8
(3) 4 : 3 (4) 3 : 4
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

148. Two cubes have their volumes in the ratio 27 : 64. The ratio of their surface areas is
(1) 9 : 25 (2) 16 : 25
(3) 9 : 16 (4) 4 : 9
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

149. The radius of the base and the height of a right circular cone are doubled. The volume of the cone will be
(1) 8 times of the previous volume
(2) three times of the previous volume
(3) $3\sqrt{2}$ times of the previous volume
(4) 6 times of the previous volume
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

150. The ratio of weights of two spheres of different materials is 8 : 17 and the ratio of weights per 1 cc of materials of each is 289 : 64. The ratio of radii of the two spheres is
(1) 8 : 17 (2) 4 : 17
(3) 17 : 4 (4) 17 : 8
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

151. Three cubes of sides 6 cm, 8 cm and 1 cm are melted to form a new cube. The surface area of the new cube is
(1) 486 cm^2 (2) 496 cm^2
(3) 586 cm^2 (4) 658 cm^2
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

152. A sphere is cut into two hemispheres. One of them is used as bowl. It takes 8 bowlfuls of this to fill a conical vessel of height 12 cm and radius 6 cm. The radius of the sphere (in centimetre) will be
(1) 3 (2) 2
(3) 4 (4) 6
(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

153. The volumes of a right circular cylinder and a sphere are equal. The radius of the cylinder and the diameter of the sphere are equal. The ratio of height and radius of the cylinder is
(1) 3 : 1 (2) 1 : 3
(3) 6 : 1 (4) 1 : 6
(SSC CGL Tier-I Exam. 19.10.2014)

154. Some bricks are arranged in an area measuring 20 cu. m. If the length, breadth and height of each brick is 25 cm, 12.5 cm and 8 cm respectively, then in that pile the number of bricks are (suppose there is no gap in between two bricks)
(1) 6,000 (2) 8,000
(3) 4,000 (4) 10,000
(SSC CGL Tier-I Exam. 26.10.2014)

155. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$th of the volume of the given cone, at what height above the base is the section made ?
(1) 19 cm (2) 20 cm
(3) 12 cm (4) 15 cm
(SSC CGL Tier-II Exam. 21.09.2014)

156. The height of the right pyramid whose area of the base is 30 m^2 and volume is 500 m^3, is
(1) 50 m (2) 60 m
(3) 40 m (4) 20 m
(SSC CGL Tier-II Exam. 21.09.2014)

157. The base of a right prism is an equilateral triangle. If the lateral surface area and volume is 120 cm^2, $40\sqrt{3}$ cm^3 respectively then the side of base of the prism is
(1) 4 cm (2) 5 cm
(3) 7 cm (4) 40 cm
(SSC CGL Tier-II Exam. 21.09.2014)

158. A ball of lead 4 cm in diameter is covered with gold. If the volume of the gold and lead are equal, then the thickness of gold [given $\sqrt[3]{2} = 1.259$] is approximately
(1) 5.038 cm (2) 5.190 cm
(3) 1.038 cm (4) 0.518 cm
(SSC CGL Tier-II Exam. 21.09.2014)

159. A large solid sphere is melted and moulded to form identical right circular cones with base radius and height same as the radius of the sphere. One of these cones is melted and moulded to form a smaller solid sphere. Then the ratio of the surface area of the smaller to the surface area of the larger sphere is
(1) $1 : 3^{\frac{4}{3}}$ (2) $1 : 2^{\frac{3}{2}}$
(3) $1 : 3^{\frac{2}{3}}$ (4) $1 : 2^{\frac{4}{3}}$
(SSC CGL Tier-II Exam. 21.09.2014)

160. A conical cup is filled with ice-cream. The ice-cream forms a hemispherical shape on its open top. The height of the hemispherical part is 7 cm. The radius of the hemispherical part equals the height of the cone. Then the volume of the ice-cream is $\left[\pi = \frac{22}{7}\right]$
(1) 1078 cubic cm
(2) 1708 cubic cm
(3) 7108 cubic cm
(4) 7180 cubic cm
(SSC CGL Tier-II Exam. 21.09.2014)

161. A hollow sphere of internal and external diameters 6 cm and 10 cm respectively is melted into a right circular cone of diameter 8 cm. The height of the cone is
(1) 22.5 cm (2) 23.5 cm
(3) 24.5 cm (4) 25.5 cm
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

162. Each edge of a regular tetrahedron is 4 cm. Its volume (in cubic cm) is
(1) $\frac{16\sqrt{3}}{3}$ (2) $16\sqrt{3}$
(3) $\frac{16\sqrt{2}}{3}$ (4) $16\sqrt{2}$
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

163. A flask in the shape of a right circular cone of height 24 cm is filled with water. The water is poured in right circular cylindrical flask whose radius is $\frac{1}{3}$rd of radius of the base of the circular cone. Then the height of the water in the cylindrical flask is
(1) 32 cm (2) 24 cm
(3) 48 cm (4) 72 cm
(SSC CHSL DEO & LDC Exam. 9.11.2014)

164. The whole surface of a cube is 150 sq.cm. Then the volume of the cube is
(1) 125 cm^3 (2) 216 cm^3
(3) 343 cm^3 (4) 512 cm^3
(SSC CHSL DEO & LDC Exam. 16.11.2014)

165. A solid metallic spherical ball of diameter 6 cm is melted and recast into a cone with diameter of the base as 12 cm. The height of the cone is
(1) 2 cm (2) 3 cm
(3) 4 cm (4) 6 cm
(SSC CHSL DEO & LDC Exam. 16.11.2014)

166. A hemispherical bowl of internal radius 15 cm contains a liquid. The liquid is to be filled into cylindrical shaped bottles of diameter 5 cm and height 6 cm. The number of bottles required to empty the bowl is
(1) 30 (2) 40
(3) 50 (4) 60
(SSC CHSL DEO & LDC Exam. 16.11.2014)

167. If V_1, V_2 and V_3 be the volumes of a right circular cone, a sphere and a right circular cylinder having the same radius and same height, then
(1) $V_1 = \frac{V_2}{2} = \frac{V_3}{3}$
(2) $\frac{V_1}{2} = \frac{V_2}{3} = V_3$
(3) $\frac{V_1}{3} = \frac{V_2}{2} = V_3$
(4) $\frac{V_1}{3} = V_2 = \frac{V_3}{2}$
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

168. If the radius of a shphere be doubled, then the percentage increase in volume is
(1) 500% (2) 700%
(3) 600% (4) 800%
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

169. If 64 buckets of water are removed from a cubical shaped water tank completely filled with water, $\frac{1}{3}$ of the tank remains filled with water. The length of each side of the tank is 1.2 m. Assuming that all buckets are of the same measure, then the volume (in litres) of water contained by each bucket is

(1) 12 (2)16

(3) 15 (4) 18

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

170. A wooden box of dimensions 8 metre × 7 metre × 6 metre is to carry rectangular boxes of dimensions 8 cm × 7 cm × 6 cm. The maximum number of boxes that can be carried in 1 wooden box is

(1) 7500000 (2) 9800000

(3) 1200000 (4) 1000000

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

171. Two circular cylinders of equal volume have their heights in the ratio 1 : 2. Ratio of their radii is (Take $\pi = \frac{22}{7}$)

(1) 1 : 4 (2) 1 : $\sqrt{2}$

(3) $\sqrt{2}$: 1 (4) 1 : 2

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

172. A rectangular piece of paper of dimensions 22 cm by 12 cm is rolled along its length to form a cylinder. The volume (in cu.cm.) of the cylinder so formed is (use $\pi = \frac{22}{7}$)

(1) 562 (2) 412

(3) 462 (4) 362

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

173. A sphere is placed inside a right circular cylinder so as to touch the top, base and the lateral surface of the cylinder. If the radius of the sphere is R, the volume of the cylinder is

(1) $2\pi R^3$ (2) $4\pi R^3$

(3) $8\pi R^3$ (4) $\frac{8}{3}\pi R^3$

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

174. The base of a right pyramid is an equilateral triangle of side 4 cm each. Each slant edge is 5 cm long. The volume of the pyramid is

(1) $\frac{4\sqrt{8}}{3}$ cm^3 (2) $\frac{4\sqrt{60}}{3}$ cm^3

(3) $\frac{4\sqrt{59}}{3}$ cm^3 (4) $\frac{4\sqrt{61}}{3}$ cm^3

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

175. If the radius of the base of a cone be 7 cm and its curved surface area be 550 sq. cm, then the volume of the cone is

(1) 1232 cu. cm (2) 1024 cu. cm

(3) 1132 cu. cm (4) 1324 cu. cm

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

176. A hemisphere of iron is melted and recast in the shape of a right circular cylinder of diameter 18 cm and height 162 cm. The radius of the hemisphere is

(1) 27 cm (2) 9 cm

(3) 6 cm (4) 12 cm

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

177. An iron sphere of radius 27 cm is melted to form a wire of length 729 cm. The radius of wire is

(1) 6 cm (2) 9 cm

(3) 18 cm (3) 36 cm

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

178. A right circular cylinder is circumscribed about a hemisphere so that they share the same base. The ratio of the volumes of cylinder and hemisphere is

(1) 4 : 3 (2) 3 : 1

(3) 3 : 4 (4) 3 : 2

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

179. The ratio of volumes of two cubes is 8 : 125. The ratio of their surface areas is

(1) 4 : 25 (2) 2 : 75

(3) 2 : 15 (4) 4 : 15

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

180. A spherical ball of radius 1 cm is dropped into a conical vessel of radius 3 cm and slant height 6 cm. The volume of water (in cm^3), that can just immerse the ball, is

(1) $\frac{5\pi}{3}$ (2) $\frac{\pi}{3}$

(3) 3 π (4) $\frac{4\pi}{3}$

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

181. Assume that a drop of water is spherical and its diameter is one-tenth of a cm. A conical glass has a height equal to the diameter of its rim. If 32000 drops of water fill the glass completely, then the height of the glass (in cm.) is

(1) 3 (2) 1

(3) 4 (4) 2

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

182. If the height of a cylinder is 4 times its circumference, the volume of the cylinder in terms of its circumference *c*, is

(1) $\frac{2c^3}{\pi}$ (2) $4\pi c^3$

(3) $\frac{c^3}{\pi}$ (4) $2\pi c^3$

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

183. Base of a right pyramid is a square whose area is 324 sq metre. If the volume of the pyramid is 1296 cu.metre, then the area (in sq. metre) of the slant surface is

(1) 432 (2) 540

(3) 1080 (4) 360

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

184. If the surface areas of two spheres are in the ratio 9 : 16, the ratio of their volumes is

(1) 16 : 9 (2) 27 : 64

(3) 64 : 27 (4) 9 : 16

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

185. The volume of a right circular cone is equal to the volume of a right circular cylinder. The height and the radius of the cylinder are 9 cm and 20 cm respectively. If the height of the cone is 108 cm, then its radius, (in cm) is

(1) 12 (2) 14

(3) 20 (4) 10

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

186. A right circular cone and a right circular cylinder have the same base and their heights are in the ratio 2 : 3. The ratio of their volumes will be

(1) 1 : 9 (2) 4 : 9
(3) 5 : 9 (4) 2 : 9

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

187. A cone, a cylinder and a hemisphere stand on equal bases and have equal heights. The ratio of their volumes is

(1) 2 : 3 : 1 (2) 2 : 1 : 3
(3) 1 : 3 : 2 (4) 1 : 2 : 3

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

188. The diameters of the internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. If it is melted and a solid cylinder of length $\frac{8}{3}$ cm is made, then the diameter (in cm) of the cylinder is

(1) 10 (2) 14
(3) 16 (4) 7

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

189. The volume of a metallic cylindrical pipe is 748 cm^3. Its length is 14 cm and external radius is 9 cm. Its thickness is

(Use $\pi = \frac{22}{7}$)

(1) 1 cm (2) 7 cm
(3) 17 cm (4) 11 cm

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

190. A cylindrical vessel of diameter 24 cm contains some water. If two spheres of radii 6 cm each are lowered into the water until they are completely immersed, then the water level (in cm) in the vessel will rise by

(1) 12 (2) 6
(3) 4 (4) 9

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

191. The perimeter of one face of a cube is 20 cm. Its volume will be

(1) 625 cm^3 (2) 100 cm^3
(3) 125 cm^3 (4) 400 cm^3

(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

192. If the volume of a sphere is numerically equal to its surface area then its diameter is

(1) 6 cm (2) 4 cm
(3) 2 cm (4) 3 cm

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

193. A conical iron piece having diameter 28 cm and height 30cm is totally immersed into the water of a cylindrical vessel, resulting in the rise of water level by 6.4 cm. The diameter, in cm, of the vessel is :

(1) 3.5 (2) $\frac{35}{2}$
(3) 32 (4) 35

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

194. A solid right prism made of iron has cross section of a triangle of sides 5cm, 10cm, 13cm and of height 10 cm. If one cubic cm of iron weights 7g, then the weight of the prism is (approximately)

(1) 1570.8 gram
(2) 1371.32 gram
(3) 1470.8 gram
(4) 1100.68 gram

(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

195. A right circular cone of height 20 cm and base radius 15 cm is melted and cast into smaller cones of equal sizes of height 5 cm and base radius 1.5 cm. The number of cones cast are

(1) 300 (2) 150
(3) 400 (4) 100

(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

196. A right prism has a triangular base whose sides are 13 cm, 20 cm and 21 cm. If the altitude of the prism is 9 cm, then its volume is

(1) 1314 cm^3 (2) 1134 cm^3
(3) 1413 cm^3 (4) 1143 cm^3

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

197. The portion of a ditch 48m long, 16.5 m wide and 4 m deep that can be filled with stones and earth available during excavation of a tunnel, cylindrical in shape, of diameter 4 m and length 56 m is

$\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) $\frac{1}{4}$ Part (2) $\frac{1}{2}$ Part
(3) $\frac{2}{9}$ Part (4) $\frac{1}{9}$ Part

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

198. If a hemisphere is melted and four spheres of equal volume are made, the radius of each sphere will be equal to

(1) $\frac{1}{4}$ th of the radius of the hemisphere
(2) radius of the hemisphere
(3) $\frac{1}{2}$ of the radius of the hemisphere
(4) $\frac{1}{6}$ th of the radius of the hemisphere

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

199. A cylinder with base radius 8 cm and height 2 cm is melted to form a cone of height 6 cm. The radius of the cone will be

(1) 6 cm (2) 8 cm
(3) 4 cm (4) 5 cm

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

200. A plane divides a right circular cone into two parts of equal volume. If the plane is parallel to the base, then the ratio, in which the height of the cone is divided, is

(1) $1 : \sqrt[3]{2}$ (2) $1 : \sqrt{2}$
(3) $1 : \sqrt[3]{2} + 1$ (4) $1 : \sqrt[3]{2} - 1$

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

201. The radii of two solid iron spheres are 1 cm and 6 cm respectively. A hollow sphere is made by melting the two spheres. If the external radius of the hollow sphere is 9 cm, then its thickness (in cm) is

(1) 2 (2) 1.5
(3) 0.5 (4) 1

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

202. The base of a right prism is a trapezium whose lengths of two parallel sides are 10 cm and 6 cm and distance between them is 5 cm. If the height of the prism is 8 cm, its volume is

(1) 320 cm^3 (2) 300.5 cm^3
(3) 310 cm^3 (4) 300 cm^3

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

203. The radius of a hemispherical bowl is 6 cm. The capacity of the bowl is

(Take $\pi = \frac{22}{7}$)

(1) 345.53 cm^3 (2) 452 cm^3
(3) 495.51 cm^3 (4) 452.57 cm^3

204. Length of each edge of a regular tetrahedron is 1 cm. Its volume is :

(1) $\frac{\sqrt{3}}{12}$ cu. cm.

(2) $\frac{1}{4}\sqrt{3}$ cu. cm.

(3) $\frac{\sqrt{2}}{6}$ cu. cm.

(4) $\frac{1}{12}\sqrt{2}$ cu. cm.

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

205. The volume of a right circular cone which is obtained from a wooden cube of edge 4.2 dm wasting minimum amount of word is :

(1) 19404 cu. dm
(2) 194.04 cu. dm
(3) 19.404 cu. dm
(4) 1940.4 cu. dm

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

206. Base of a right prism is a rectangle, the ratio of whose length and breadth is 3 : 2. If the height of the prism is 12 cm and total surface area is 288 sq. cm., the volume of the prism is :

(1) 291 cm^3 (2) 288 cm^3
(3) 290 cm^3 (4) 286 cm^3

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

207. A right triangle with sides 9 cm, 12 cm and 15 cm is rotated about the side of 9 cm to form a cone. The volume of the cone so formed is :

(1) 327 π cm^3 (2) 330 π cm^3
(3) 334 π cm^3 (4) 324 π cm^3

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

208. Volume of a right circular cylinder of height 21 cm and base radius 5 cm is :

(1) 1255 cm^3 (2) 1050 cm^3
(3) 1175 cm^3 (4) 1650 cm^3

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

209. The volume of the largest right circular cone that can be cut out of a cube of edge 7 cm ?

$\left(\text{Use } \pi = \frac{22}{7}\right)$

(1) 121 cm^3 (2) 89.8 cm^3
(3) 13.6 cm^3 (4) 147.68 cm^3

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

210. By melting two solid metallic spheres of radii 1 cm and 6 cm, a hollow sphere of thickness 1 cm is made. The external radius of the hollow sphere will be

(1) 9 cm (2) 6 cm
(3) 7 cm (4) 8 cm

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

211. Height of a prism–shaped part of a machine is 8 cm and its base is an isosceles triangle, whose each of the equal sides is 5 cm and remaining side is 6 cm. The volume of the part is

(1) 96 cu. cm (2) 120 cu. cm
(3) 86 cu. cm (4) 90 cu. cm

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

212. A cuboidal shaped water tank, 2.1 m long and 1.5 m broad is half filled with water. If 630 litres more water is poured into that tank, the water level will rise

(1) 0.15 cm (2) 0.20 metre
(3) 0.18 cm (4) 2 cm

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

213. A solid sphere of radius 9 cm is melted to form a sphere of radius 6 cm and a right circular cylinder of same radius. The height of the cylinder so formed is

(1) 19 cm (2) 21 cm
(3) 23 cm (4) 25 cm

(SSC CGL Tier-I (CBE) Exam.10.09.2016)

214. A hollow cylindrical tube 20 cm. long is made of iron and its external and internal diameters are 8 cm. and 6 cm. respectively. The volume (in cubic cm.) of iron used in making the tube is

$\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 1760 (2) 440
(3) 220 (4) 880

(SSC CGL Tier-II Online Exam.01.12.2016)

215. If the areas of three adjacent faces of a rectangular box which meet in a corner are 12 cm^2, 15 cm^2 and 20 cm^2 respectively, then the volume of the box is

(1) 3600 cm^3 (2) 300 cm^3
(3) 60 cm^3 (4) 180 cm^3

(SSC CGL Tier-II Online Exam.01.12.2016)

216. A cylindrical pencil of diameter 1.2 cm has one of its ends sharpened into a conical shape of height 1.4 cm. The volume of the material removed is

(1) 1.056 cm^3 (2) 4.224 cm^3
(3) 10.56 cm^3 (4) 42.24 cm^3

(SSC CGL Tier-II Online Exam.01.12.2016)

217. A hemispherical bowl of internal radius 9 cm, contains a liquid. This liquid is to be filled into small cylindrical bottles of diameter 3 cm and height 4 cm. Then the number of bottles necessary to empty the bowl is

(1) 18 (2) 45
(3) 27 (4) 54

(SSC CGL Tier-II Online Exam.01.12.2016)

218. A rectangular water tank is 80 metre × 40 metre. Water flows into it through a pipe of 40 sq.cm at the opening at a speed of 10 km/hr. The water level will rise in the tank in half an hour by

(1) $\frac{3}{2}$ cm. (2) $\frac{4}{9}$ cm.

(3) $\frac{5}{9}$ cm. (4) $\frac{5}{8}$ cm.

(SSC CGL Tier-II Online Exam.01.12.2016)

219. A solid cylinder has the total surface area 231 square cm. If its curved surface area is $\frac{2}{3}$ of the total surface area, then the volume of the cylinder is
(1) 154 cu. cm. (2) 308 cu. cm.
(3) 269.5 cu. cm (4) 370 cu. cm
(SSC CGL Tier-II Online Exam.01.12.2016)

220. A right circular cylinder having diameter 21 cm and height 38 cm is full of ice cream. The ice cream is to be filled in cones of height 12 cm and diameter 7 cm having a hemispherical shape on the top. The number of such cones to be filled with ice cream is
(1) 54 (2) 44
(3) 36 (4) 24
(SSC CGL Tier-II Online Exam.01.12.2016)

221. THe sides of a rectangle with dimension 7 cm × 11 cm are joined to form a cylinder with height 11 cm. What is the volume of this cylinder?
(1) 85.75 cm^3 (2) 86.92 cm^3
(3) 54.25 cm^3 (4) 42.875 cm^3
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

222. A spherical aquarium can accommodate 11 fishes, and each fish requires 1.54 cu. metre of water. What is the volume of the aquarium ?
(1) 11.14 cu. metre
(2) 16.94 cu. metre
(3) 10.25 cu. metre
(4) 17.84 cu. metre
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

223. The volume of a right rectangular pyramid is 220 m^3. What is the height of the pyramid, if the area of its base is 55 m^2 ?
(1) 8 metre (2) 13.5 metre
(3) 12 metre (4) 9 metre
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

224. The radius of a wire is decreased to one third. If volume remains the same, length will increase by :
(1) 6 times (2) 1 time
(3) 3 times (4) 9 times
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

225. A prism with a right triangular base is 25 cm high. If the shorter sides of the triangle are in the ratio of 1 : 2 and the volume of the prism is 100 cm^3, what is the length of the longest side of the triangle?
(1) $\sqrt{5}$ cm (2) $2\sqrt{5}$ cm
(3) $5\sqrt{2}$ cm (4) 5 cm
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

226. The ratio of the volume of a cube to that of a sphere which will fit inside the cube is
(1) $4 : \pi$ (2) $4 : 3\pi$
(3) $6 : \pi$ (4) $2 : \pi$
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

227. On a rainy day, 60 cm of rain is recorded in a region. What is the volume of water collected in an open and empty rectangular water tank that measures 12 m (length) ×10 m (width) and 50 cm (depth)?
(1) 120 m^3 (2) 72 m^3
(3) 60 m^3 (4) 48 m^3
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

228. How many hemispherical balls can be made from a cylinder 56 cm high and 12 cm diameter, when every ball being 0.75 cm in radius?
(1) 1792 (2) 3584
(3) 4824 (4) 7168
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

229. The number of coins of radius 0.75 cm and thickness 0.2cm required to be melted to make a right circular cylinder of height 8 cm and base radius 3 cm is :
(1) 500 (2) 600
(3) 460 (4) 640
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (IInd Sitting)

230. A sphere of radius 5 cm is melted to form a cone with base of same radius. The height (in cm) of the cone is
(1) 5 (2) 10
(3) 20 (4) 22
(SSC CGL Tier-I (CBE) Exam. 28.08.2016) (IInd Sitting)

231. The diameters of two cylinders are in the ratio 3:2 and their volumes are equal. The ratio of their heights is
(1) 2 : 3 (2) 3 : 2
(3) 9 : 4 (4) 4 : 9
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (Ist Sitting)

232. A cylindrical container of 32 cm height and 18 cm radius is filled with sand. Now all this sand is used to form a conical heap of sand. If the height of the conical heap is 24 cm, what is the radius of its base ?
(1) 12 cm (2) 24 cm
(3) 36 cm (4) 48 cm
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (Ist Sitting)

233. A cylindrical vessel of radius 4 cm. contains water. A solid sphere of radius 3 cm. is dipped into the water until it is completely immersed. The water level in the vessel will rise by
(1) 3.5 cm. (2) 2.25 cm.
(3) 2 cm. (4) 3.8 cm.
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (IInd Sitting)

234. A hollow hemispherical bowl is made of silver with its outer radius 8 cm and inner radius 4 cm respectively. The bowl is melted to form a solid right circular cone of radius 8 cm. The height of the cone formed is
(1) 7 cm. (2) 9 cm.
(3) 12 cm. (4) 14 cm.
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

235. If the sum of radius and height of a solid cylinder is 20 cm and its total surface area is 880 $cm.^2$ then its volume is
(1) 1760 $cm.^3$ (2) 8800 $cm.^3$
(3) 2002 $cm.^3$ (4) 4804 $cm.^3$
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

236. A solid sphere and a solid hemisphere have the same total surface area. The ratio of their volumes is $\left(\text{Take}, \pi = \frac{22}{7}\right)$
(1) $3\sqrt{3} : 4$ (2) $4 : 3\sqrt{3}$
(3) $3 : 4\sqrt{3}$ (4) $1 : 12\sqrt{3}$
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

237. The base of a right prism is a trapezium whose lengths of parallel sides are 25 cm. and 11 cm. and the perpendicular distance between the parallel sides is 16 cm. If the height of the prism is 10 cm., then the volume of the prism is
(1) 1440 cu. cm.
(2) 1540 cu. cm.
(3) 2880 cu. cm.
(4) 960 cu. cm.
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

238. The external and the internal radii of a hollow right circular cylinder of height 15 cm. are 6.75 cm. and 5.25 cm. respectively. If it is melted to form a solid cylinder of height half of the original cylinder, then the radius of the solid cylinder is
(1) 6 cm. (2) 6.5 cm.
(3) 7 cm. (4) 7.25 cm.
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

239. If a cone is divided into two parts by drawing a plane through the midpoints of its axis, then the ratio of the volume of the two parts of the cone is
(1) 1 : 2 (2) 1 : 4
(3) 1 : 7 (4) 1 : 8
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

240. A right circular cylinder is partially filled with water. Two iron spherical balls are completely immersed in the water so that the height of the water in the cylinder rises by 4 cm. If the radius of one ball is half of the other and the diameter of the cylinder is 18 cm., then the radii of the spherical balls are
(1) 6 cm. and 12 cm.
(2) 4 cm. and 8 cm.
(3) 3 cm. and 6 cm.
(4) 2 cm. and 4 cm.
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

241. The radii of two cylinders are in the ratio of 3 : 2 and their heights are in the ratio 3 : 7. The ratio of their volumes is :
(1) 4 : 7 (2) 7 : 4
(3) 28 : 27 (4) 27 : 28
(SSC CGL Tier-I (CBE) Exam. 31.08.2016 (IIIrd Sitting)

242. If the volumes of two right circular cones are in the ratio 1 : 4 and their diameters of bases are in the ratio 4 : 5, then their heights will be in the ratio :
(1) 1 : 5 (2) 4 : 25
(3) 16 : 25 (4) 25 : 64
(SSC CGL Tier-I (CBE) Exam. 30.08.2016 (IIIrd Sitting)

243. The volume of metallic cylindrical (hollow) pipe of uniform thickness is 748 c.c. Its length is 14 cm and its external radius is 9 cm. The thickness of the pipe is
(1) 0.5 cm (2) 1.5 cm
(3) 1 cm (4) 2 cm
(SSC CGL Tier-I (CBE) Exam. 29.08.2016 (Ist Sitting)

244. The diagonal of a cube is $\sqrt{192}$ cm. Its volume (in cm^3) will be
(1) 216 (2) 432
(3) 512 (4) 624
(SSC CGL Tier-I (CBE) Exam. 02.09.2016 (IInd Sitting)

245. The radius of the base of a right circular cone is 6 cm and its slant height is 10 cm. Then its volume is $\left(\text{Use } \pi = \frac{22}{7}\right)$
(1) 301.71 cm.^{3}
(2) 310.71 cm.^{3}
(3) 301.17 cm.^{3}
(4) 310.17 cm.^{3}
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IIIrd Sitting)

246. Three solid spheres have their radii r_1, r_2 and r_3. The spheres are melted to form a solid sphere of bigger radius. Then the radius of the new sphere is :
(1) $(r_1 + r_2 + r_3)$
(2) $\left(r_1^2 + r_2^2 + r_3^2\right)^{\frac{1}{2}}$
(3) $\left(r_1^3 + r_2^3 + r_3^3\right)^{\frac{1}{3}}$
(4) $\left(r_1^4 + r_2^4 + r_3^4\right)^{\frac{1}{4}}$
(SSC CGL Tier-I (CBE) Exam. 04.09.2016 (IInd Sitting)

247. The ratio of the weights of two spheres is 8 : 27 and the ratio of weights per 1 cc of materials of two is 8 : 1. The ratio of the radii of the spheres is
(1) 2 : 3 (2) 1 : 3
(3) 3 : 1 (4) 3 : 2
(SSC CGL Tier-I (CBE) Exam. 04.09.2016 (IIIrd Sitting)

248. A spherical lead ball of radius 6 cm is melted and small lead balls of radius 3 mm are made. The total number of possible small lead balls is :
(1) 4250 (2) 4000
(3) 8005 (4) 8000
(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IInd Sitting)

249. The heights of a cone and a cylinder are equal. The radii of their bases are in the ratio 2 : 1. The ratio of their volumes is :
(1) 4 : 3 (2) 3 : 4
(3) 2 : 1 (4) 1 : 2
(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

250. The base area of a right pyramid is 57 sq. units and height is 10 units. Then the volume of the pyramid is
(1) 190 cubic units
(2) 380 cubic units
(3) 540 cubic units
(4) 570 cubic units
(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IInd Sitting)

251. The radius of a sphere and right circular cylinder is '*r*' units. Their volumes are equal. The ratio of the height and radius of the cylinder is :
(1) 3 : 1 (2) 2 : 1
(3) 3 : 2 (4) 4 : 3
(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IIIrd Sitting)

252. The radius of cross section of a solid right circular cylindrical rod is 3.2 dm. The rod is melted and 44 equal solid cubes of side 8 cm are formed. The length of the rod is :
$\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 56 cm. (2) 7 cm.
(3) 5.6 cm. (4) 0.7 cm.
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IIIrd Sitting)

253. A cylindrical vessel of height 5 cm and radius 4 cm is completely filled with sand. When this sand is poured out it forms a right circular cone of radius 6 cm. What will be the height of this cone?
(Take ? = $\frac{22}{7}$)
(1) 6.67 cm (2) 2.22 cm
(3) 3.33 cm (4) 1.67 cm
(SSC CHSL (10+2) Tier-I (CBE) Exam. 16.01.2017) (IInd Sitting)

254. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is
(1) 27 : 20 (2) 20 : 27
(3) 4 : 9 (4) 9 : 4
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

255. Three cubes of iron whose edges are 6 cm, 8 cm and 10 cm respectively are melted and formed into a single cube. The edge of the new cube formed is
(1) 12 cm. (2) 14 cm.
(3) 16 cm. (4) 18 cm.
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

256. The radius of a sphere is 6 cm. It is melted and drawn into a wire of radius 0.2 cm. The length of the wire is
(1) 81 metre (2) 80 metre
(3) 75 metre (4) 72 metre
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

257. The radius of a wire is decreased to one-third. If volume remains the same, length will increase by
(1) 1.5 times (2) 3 times
(3) 6 times (4) 9 times
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

258. From each of the four corners of a rectangular sheet of dimensions 25 cm × 20 cm, a square of side 2 cm is cut off and a box is made. The volume of the box is
(1) 828 cm.^{3} (2) 672 cm.^{3}
(3) 500 cm.^{3} (4) 1000 cm.^{3}
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

259. A solid sphere of radius 3 cm is melted to form a hollow right circular cylindrical tube of length 4 cm and external radius 5 cm. The thickness of the tube is
(1) 1 cm. (2) 9 cm.
(3) 0.6 cm. (4) 1.5 cm.
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

260. Three small lead spheres of radii 3 cm, 4 cm and 5 cm respectively, are melted into a single sphere. The diameter of the new sphere is
(1) 6 cm (2) 7 cm
(3) 8 cm (4) 12 cm
(SSC Multi-Tasking Staff Exam. 30.04.2017)

261. The height of a right circular cylinder is three times the radius of the base. If the height were four times the radius, the volume would be 1078 cubic centimetre more than it was previously. Find the radius of the base.
(1) 6 cm (2) 5 cm
(3) 7.5 cm (4) 7 cm
(SSC Multi-Tasking Staff Exam. 30.04.2017)

TYPE–V

1. A cistern 6 m long and 4 m wide, contains water up to a depth of 1 m 25 cm. The total area of the wet surface is
(1) 55 m^2 (2) 53.5 m^2
(3) 50 m^2 (4) 49 m^2.
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

2. If the height of a cylinder is increased by 15 per cent and the radius of its base is decreased by 10 per cent then by what percent will its curved surface area change?
(1) 3.5 per cent decrease
(2) 3.5 per cent increase
(3) 5 per cent increase
(4) 5 per cent decrease
(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

3. The radii of the base of two cylinders are in the ratio 3 : 5 and their heights in the ratio 2 : 3. The ratio of their curved surface will be :
(1) 2 : 5 (2) 2 : 3
(3) 3 : 5 (4) 5 : 3
(SSC CPO S.I. Exam. 16.12.2007)

4. Water flows through a cylindrical pipe, whose radius is 7 cm, at 5 metre per second. The time, it takes to fill an empty water tank, with height 1.54 metres and area of the base (3 × 5) square metres, is $\left(\text{take } \pi = \frac{22}{7}\right)$
(1) 6 minutes (2) 5 minutes
(3) 10 minutes (4) 9 minutes
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

5. A solid cylinder has total surface area of 462 sq.cm. Its curved surface area is $\frac{1}{3}$rd of the total surface area. Then the radius of the cylinder is
(1) 7 cm (2) 3.5 cm
(3) 9 cm (4) 11 cm
(SSC (CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

6. The diameter of a cylinder is 7 cm and its height is 16 cm. Using the value of $\pi = \frac{22}{7}$, the lateral surface area of the cylinder is
(1) 352 cm.^{2} (2) 350 cm.^{2}
(3) 355 cm.^{2} (4) 348 cm.^{2}
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

7. The height of a solid right circular cylinder is 6 metres and three times the sum of the area of its two end faces is twice the area of its curved surface. The radius of its base (in metre) is
(1) 4 (2) 2
(3) 8 (4) 10
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

8. The height of a circular cylinder is increased six times and the base area is decreased to one-ninth of its value. The factor by which the lateral surface of the cylinder increases is
(1) 2 (2) $\frac{1}{2}$
(3) $\frac{2}{3}$ (4) $\frac{3}{2}$
(SSC Graduate Level Tier-II Exam.16.09.2012)

9. The radius and height of a cylinder are in the ratio. 5 : 7 and its volume is 550 cm^3. Calculate its curved surface area in sq. cm.
(1) 110 (2) 444
(3) 220 (4) 616
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

10. The area of the curved surface and the area of the base of a right circular cylinder are a square cm and b square cm respectively. The height of the cylinder is
(1) $\frac{2a}{\sqrt{\pi b}}$ cm (2) $\frac{a\sqrt{b}}{2\sqrt{\pi}}$ cm
(3) $\frac{a}{2\sqrt{\pi b}}$ cm (4) $\frac{a\sqrt{\pi}}{2\sqrt{b}}$ cm
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

11. Find the length of the largest rod that can be placed in a room 16m long, 12m broad and $10\frac{2}{3}$ m. high.
(1) 23 m. (2) 68 m.
(3) $22\frac{2}{3}$ m. (4) $22\frac{1}{3}$ m.
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

12. If the volume of two cubes are in the ratio 27 : 64, then the ratio of their total surface area is :
(1) 27 : 64 (2) 3 : 4
(3) 9 : 16 (4) 3 : 8
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

13. Find the length of the longest rod that can be placed in a hall of 10 m length, 6 m breadth and 4 m height.
(1) $2\sqrt{38}$ m (2) $4\sqrt{38}$ m
(3) $2\sqrt{19}$ m (4) 19 m
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

14. The volume of a cuboid is twice the volume of a cube. If the dimensions of the cuboid are 9 cm, 8 cm and 6 cm, the total surface area of the cube is :
(1) 72 cm^2 (2) 216 cm^2
(3) 432 cm^2 (4) 108 cm^2
(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (IInd Sitting)

15. The length, breadth and height of a room is 5m, 4m and 3m respectively. Find the length of the largest bamboo that can be kept inside the room.
(1) 5 m (2) 60 m
(3) 7 m (4) $5\sqrt{2}$ m
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

16. The length of the longest rod that can be placed in a room which is 12 m long, 9 m broad and 8 m high is
(1) 27 m (2) 19 m
(3) 17 m (4) 13 m
(SSC Section Officer (Commercial Audit) Exam. 16.11.2003) & (SSC CPO S.I. Exam. 06.09.2009) & (SSC CISF Constable (GD) Exam. 05.06.2011)

17. A cube of edge 5 cm is cut into cubes each of edge of 1 cm. The ratio of the total surface area of one of the small cubes to that of the large cube is equal to :
(1) 1 : 125 (2) 1 : 5
(3) 1 : 625 (4) 1 : 25
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

18. The perimeter of the floor of a room is 18 m. What is the area of the walls of the room, if the height of the room is 3 m ?
(1) 21 m^2 (2) 42 m^2
(3) 54 m^2 (4) 108 m^2
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

19. The length (in metres) of the longest rod that can be put in a room of dimensions 10 m × 10 m × 5 m is
(1) $15\sqrt{3}$ (2) 15
(3) $10\sqrt{2}$ (4) $5\sqrt{3}$
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

20. The floor of a room is of size 4 m × 3 m and its height is 3 m. The walls and ceiling of the room require painting. The area to be painted is
(1) 66 m^2 (2) 54 m^2
(3) 43 m^2 (4) 33 m^2
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

21. If the sum of three dimensions and the total surface area of a rectangular box are 12 cm and 94 cm^2 respectively, then the maximum length of a stick that can be placed inside the box is
(1) $5\sqrt{2}$ cm (2) 5 cm
(3) 6 cm (4) $2\sqrt{5}$ cm
(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011(Paper-I)

22. If the length of the diagonal of a cube is $8\sqrt{3}$ cm, then its surface area is
(1) 192 cm^2 (2) 512 cm^2
(3) 768 cm^2 (4) 384 cm^2
FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

23. The area of the four walls of a room is 660 m^2 and its length is twice its breadth. If the height of the room is 11 m, then area of its floor (in m^2) is
(1) 120 (2) 150
(3) 200 (4) 330
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

24. The maximum length of a pencil that can be kept in a rectangular box of dimensions 8cm × 6cm × 2cm is
(1) $2\sqrt{13}$ cm (2) $2\sqrt{14}$ cm
(3) $2\sqrt{26}$ cm (4) $10\sqrt{2}$ cm
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

25. The volume of a cubical box is 3.375 cubic metres. The length of edge of the box is
(1) 75 cm (2) 1.5 m
(3) 1.125 m (4) 2.5 m
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

26. Diagonal of a cube is $6\sqrt{3}$ cm. Ratio of its total surface area and volume (numerically) is
(1) 2 : 1 (2) 1 : 6
(3) 1 : 1 (4) 1 : 2
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

27. The length of the largest possible rod that can be placed in a cubical room is $35\sqrt{3}$ m. The surface area of the largest possible sphere that fit within the cubical room (assuming $\pi = \frac{22}{7}$) (in square m) is
(1) 3,500 (2) 3,850
(3) 2,450 (4) 4,250
(SSC Multi-Tasking Staff Exam. 10.03.2013)

28. The volume of air in a room is 204 m^3. The height of the room is 6 m. What is the floor area of the room ?
(1) 32 m^2 (2) 46 m^2
(3) 44 m^2 (4) 34 m^2
(SSC CHSL DEO & LDC Exam. 20.10.2013)

29. The slant height of a conical mountain is 2.5 km and the area of its base is 1.54 km^2. Taking $\pi = \frac{22}{7}$, the height of the mountain is :
(1) 2.2 km (2) 2.4 km
(3) 3 km (4) 3.11 km
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

30. The base of a conical tent is 19.2 metres in diameter and the height of its vertex is 2.8 metres. The area of the canvas required to put up such a tent (in square metres) (taking $\pi = \frac{22}{7}$) is nearly.
(1) 3017.1 (2) 3170
(3) 301.7 (4) 30.17
(SSC CGL Prelim Exam. 24.02.2002 & 27.07.2008 (Second Sitting)

31. If S denotes the area of the curved surface of a right circular cone of height h and semivertical angle α then S equals
(1) $\pi h^2 \tan^2 \alpha$
(2) $\frac{1}{3} \pi h^2 \tan^2 \alpha$
(3) $\pi h^2 \sec \alpha \tan \alpha$
(4) $\frac{1}{3} \pi h^2 \sec \alpha \tan \alpha$
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

32. The height and the radius of the base of a right circular cone are 12 cm and 6cm respectively. The radius of the circular cross-section of the cone cut by a plane parallel to its base at a distance of 3 cm from the base is
(1) 4 cm (2) 5.5 cm
(3) 4.5 cm (4) 3.5 cm
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

33. The radius of base and slant height of a cone are in the ratio 4 : 7. If its curved surface area is 792 cm^2, then the radius (in cm) of its base is [Use π = 22/7]
(1) 8 (2) 12
(3) 14 (4) 16
(SSC (South Zone) Investigator Exam. 12.09.2010)

34. A semi-circular sheet of metal of diameter 28 cm is bent into an open conical cup. The depth of the cup is approximately
(1) 11 cm (2) 12 cm
(3) 13 cm (4) 14 cm
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

35. The radius and the height of a cone are in the ratio 4 : 3. The ratio of the curved surface area and total surface area of the cone is
(1) 5 : 9 (2) 3 : 7
(3) 5 : 4 (4) 16 : 9
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

36. A right angled sector of radius r cm is rolled up into a cone in such a way that the two binding radii are joined together. Then the curved surface area of the cone is
(1) πr^2 cm^2 (2) $4\pi r^2$ cm^2
(3) $\frac{\pi r^2}{4}$ cm^2 (4) $2\pi r^2$ cm^2
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

37. The radius of the base of a conical tent is 16 metre. If $427\frac{3}{7}$ sq. metre canvas is required to construct the tent, then the slant height of the tent is : $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 17 metre (2) 15 metre
(3) 19 metre (4) 8.5 metre
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

38. The volume of a right circular cone is 1232 cm^3 and its vertical height is 24 cm. Its curved surface area is
(1) 154 cm^2 (2) 550 cm^2
(3) 604 cm^2 (4) 704 cm^2
(SSC CGL Prelim Exam. 11.05.2003 (Ist Sitting) & (SSC Graduate Level Tier-II Exam.16.09.2012 & 29.09.2013)

39. If h, c, v are respectively the height, curved surface area and volume of a right circular cone, then the value of $3\pi vh^3 - c^2h^2 + 9v^2$ is
(1) 2 (2) –1
(3) 1 (4) 0
(SSC Graduate Level Tier-II Exam. 29.09.2013)

40. If the radius of a sphere is increased by 2 cm. its surface area increased by 352 cm^2. The radius of sphere before change is : $\left(\text{use } \pi = \frac{22}{7}\right)$
(1) 3 cm (2) 4 cm
(3) 5 cm (4) 6 cm
(SSC CGL Prelim Exam. 04.07.1999 (Ist Sitting) & (SSC CPO S.I. Exam.12.01.2003)

41. Spheres A and B have their radii 40 cm and 10 cm respectively. Ratio of surface area of A to the surface area of B is :
(1) 1 : 16 (2) 4 : 1
(3) 1 : 4 (4) 16 : 1
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

42. The volume of a sphere is $\frac{88}{21} \times (14)^3$ cm^3. The curved surface of the sphere is (Take p $= \frac{22}{7}$)
(1) 2424 cm^2 (2) 2446 cm^2
(3) 2484 cm^2 (4) 2464 cm^2
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

43. The surface area of a sphere is $64\pi cm^2$. Its diameter is equal to
(1) 16 cm (2) 8 cm
(3) 4 cm (4) 2 cm
(SSC CPO S.I. Exam. 07.09.2003)

44. The diameter of two hollow spheres made from the same metal sheet are 21 cm and 17.5 cm respectively. The ratio of the area of metal sheets required for making the two spheres is
(1) 6 : 5 (2) 36 : 25
(3) 3 : 2 (4) 18 : 25
(SSC CPO S.I. Exam. 05.09.2004)

45. When the circumference of a toy ballon is increased from 20 cm to 25 cm, its radius (in cm) is increased by :
(1) 5 (2) $\frac{5}{\pi}$
(3) $\frac{5}{2\pi}$ (4) $\frac{\pi}{5}$
(SSC CPO S.I. Exam. 26.05.2005)

46. If the volume and surface area of a sphere are numerically the same, then its radius is :
(1) 1 unit (2) 2 units
(3) 3 units (4) 4 units
(SSC CPO S.I. Exam. 26.05.2005)

47. The ratio of the surface area of a sphere and the curved surface area of the cylinder circumscribing the sphere is
(1) 1 : 2 (2) 1 : 1
(3) 2 : 1 (4) 2 : 3
(SSC CPO S.I. Exam. 03.09.2006)

48. The total surface area of a metallic hemisphere is 1848 cm^2. The hemisphere is melted to form a solid right circular cone. If the radius of the base of the cone is the same as the radius of the hemisphere, its height is
(1) 42 cm (2) 26 cm
(3) 28 cm (4) 30 cm
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

49. If the radii of two spheres are in the ratio 1 : 4, then their surface area are in the ratio :
(1) 1 : 2 (2) 1 : 4
(3) 1 : 8 (4) 1 : 16
(SSC CPO S.I. Exam. 16.12.2007)

50. A solid metallic sphere of radius 8 cm is melted to form 64 equal small solid spheres. The ratio of the surface area of this sphere to that of a small sphere is
(1) 4 : 1 (2) 1 : 16
(3) 16 : 1 (4) 1 : 4
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

51. If S_1 and S_2 be the surface area of a sphere and the curved surface area of the circumscribed cylinder respectively, then S_1 is equal to
(1) $\frac{3}{4}S_2$ (2) $\frac{1}{2}S_2$
(3) $\frac{2}{3}S_2$ (4) S_2
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

52. The volume of two spheres are in the ratio 8 : 27. The ratio of their surface area is :
(1) 4 : 9 (2) 2 : 3
(3) 4 : 5 (4) 5 : 6
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

53. The volume of a solid hemisphere is 19404 cm^3. Its total surface area is
(1) 4158 cm^2 (2) 2858 cm^2
(3) 1738 cm^2 (4) 2038 cm^2
(SSC Graduate Level Tier-II Exam.16.09.2012)

54. A sphere and a hemisphere have the same volume. The ratio of their curved surface area is :
(1) $2^{-\frac{3}{2}} : 1$ (2) $2^{\frac{2}{3}} : 1$
(3) $4^{-\frac{2}{3}} : 1$ (4) $2^{\frac{1}{3}} : 1$
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

55. If the radius of a sphere be doubled, the area of its surface will become
(1) Double
(2) Three times
(3) Four times
(4) None of the mentioned
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

56. A solid hemisphere is of radius 11 cm. The curved surface area in sq. cm is
(1) 1140.85 (2) 1386.00
(3) 760.57 (4) 860.57
(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

57. If the total surface area of a hemisphere is 27π square cm, then the radius of the base of the hemisphere is
(1) $9\sqrt{3}$ cm (2) 3 cm
(3) $3\sqrt{3}$ cm (4) 9 cm
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

58. The base of a solid right prism is a triangle whose sides are 9 cm, 12 cm and 15 cm. The height of the prism is 5 cm. Then, the total surface area of the prism is
(1) 180 cm^2 (2) 234 cm^2
(3) 288 cm^2 (4) 270 cm^2
(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

59. The base of a right prism is an equilateral triangle of area 173 cm^2 and the volume of the prism is 10380 cm^3. The area of the lateral surface of the prism is (use $\sqrt{3}$ = 1.73)
(1) 1200 cm^2 (2) 2400 cm^2
(3) 3600 cm^2 (4) 4380 cm^2
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

60. The base of a right pyramid is a square of side 16 cm long. If its height be 15 cm, then the area of the lateral surface in square centimetre is :
(1) 136 (2) 544
(3) 800 (4) 1280
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

61. If the slant height of a right pyramid with square base is 4 metre and the total slant surface of the pyramid is 12 square metre, then the ratio of total slant surface and area of the base is :
(1) 16 : 3 (2) 24 : 5
(3) 32 : 9 (4) 12 : 3
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

62. The base of a right pyramid is an equilateral triangle of side $10\sqrt{3}$ cm. If the total surface area of the pyramid is $270\sqrt{3}$ sq. cm, its height is
(1) $12\sqrt{3}$ cm (2) 10 cm
(3) $10\sqrt{3}$ cm (4) 12 cm
(SSC CHSL DEO & LDC Exam. 20.10.2013)

63. A right prism stands on a base 6 cm equilateral triangle and its volume is $81\sqrt{3}$ cm^3. The height (in cm) of the prism is
(1) 9 (2) 10
(3) 12 (4) 15
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

64. A right pyramid stands on a square base of diagonal $10\sqrt{2}$ cm. If the height of the pyramid is 12 cm, the area (in cm^2) of its slant surface is
(1) 520 (2) 420
(3) 360 (4) 260
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

65. If the altitude of a right prism is 10 cm and its base is an equilateral triangle of side 12 cm, then its total surface area (in cm^2) is
(1) $(5 + 3\sqrt{3})$ (2) $36\sqrt{3}$
(3) 360 (4) $72(5+\sqrt{3})$
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

66. A right pyramid stands on a base 16 cm square and its height is 15 cm. The area (in cm^2) of its slant surface is
(1) 514 (2) 544
(3) 344 (4) 444
(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

67. The base of a right prism is a right-angled triangle whose sides are 5 cm, 12 cm and 13 cm. If the area of the total surface of the prism is 360 cm^2, then its height (in cm) is
(1) 10 (2) 12
(3) 9 (4) 11
(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

68. A hemisphere and a cone have equal base. If their heights are also equal, the ratio of their curved surface will be :
(1) $1 : \sqrt{2}$ (2) $\sqrt{2} : 1$
(3) 1 : 2 (4) 2 : 1
(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (Ist Sitting) & (SSC CGL Tier-I Exam. 26.06.2011 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting) (Delhi Zone)

69. A right circular cylinder just encloses a sphere of radius *r*. The ratio of the surface area of the sphere and the curved surface area of the cylinder is

(1) 2 : 1 (2) 1 : 2
(3) 1 : 3 (4) 1 : 1

(SSC SAS Exam. 26.06.2010 (Paper-1)

70. A sphere and a cylinder have equal volume and equal radius. The ratio of the curved surface area of the cylinder to that of the sphere is

(1) 4 : 3 (2) 2 : 3
(3) 3 : 2 (4) 3 : 4

(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011) & (SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

71. A circus tent is cylindrical up to a height of 3 m and conical above it. If its diameter is 105m and the slant height of the conical part is 63 m, then the total area of the canvas required to make the tent is $\left(\text{take } \pi = \frac{22}{7}\right)$

(1) 11385 m^2 (2) 10395 m^2
(3) 9900 m^2 (4) 990 m^2

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

72. A right circular cylinder and a cone have equal base radius and equal height. If their curved surfaces are in the ratio 8 : 5, then the radius of the base to the height are in the ratio :

(1) 2 : 3 (2) 4 : 3
(3) 3 : 4 (4) 3 : 2

(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

73. The base of a cone and a cylinder have the same radius 6 cm. They have also the same height 8 cm. The ratio of the curved surface of the cylinder to that of the cone is

(1) 8 : 5 (2) 8 : 3
(3) 4 : 3 (4) 5 : 3

(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

74. A solid right circular cylinder and a solid hemisphere stand on equal bases and have the same height. The ratio of their whole surface area is:

(1) 3 : 2 (2) 3 : 4
(3) 4 : 3 (4) 2 : 3

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

75. A square of side 3 cm is cut off from each corner of a rectangular sheet of length 24 cm and breadth 18 cm and the remaining sheet is folded to form an open rectangular box. The surface area of the box is

(1) 468 cm^2 (2) 396 cm^2
(3) 612 cm^2 (4) 423 cm^2

(SSC CHSL DEO & LDC Exam. 20.10.2013)

76. Three solid iron cubes of edges 4 cm, 5 cm and 6 cm are melted together to make a new cube. 62 cm^3 of the melted material is lost due to improper handling. The area (in cm^2) of the whole surface of the newly formed cube is

(1) 294 (2) 343
(3) 125 (4) 216

(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

77. If each edge of a cube is increased by 50%, the percentage increase in its surface area is

(1) 150% (2) 75%
(3) 100% (4) 125%

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013) & (SSC GL Tier-II Exam. 29.09.2013)

78. The length of each edge of a regular tetrahedron is 12 cm. The area (in sq. cm) of the total surface of the tetrahedron is

(1) $288\sqrt{3}$ (2) $144\sqrt{2}$
(3) $108\sqrt{3}$ (4) $144\sqrt{3}$

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

79. A toy is in the form of a cone mounted on a hemisphere. The radius of the hemisphere and that of the cone is 3 cm and height of the cone is 4 cm. The total surface area of the toy (taking $\pi = \frac{22}{7}$) is

(1) 75.43 sq. cm.
(2) 103.71 sq. cm.
(3) 85.35 sq. cm.
(4) 120.71 sq. cm.

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

80. Area of the floor of a cubical room is 48 sq.m. The length of the longest rod that can be kept in that room is

(1) 9 metre (2) 12 metre
(3) 18 metre (4) 6 metre

(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

81. A sphere and a hemisphere have the same radius. Then the ratio of their respective total surface areas is

(1) 2 : 1 (2) 1 : 2
(3) 4 : 3 (4) 3 : 4

(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

82. If the surface area of a sphere is 346.5 cm^2, then its radius $\left[\text{taking } \pi = \frac{22}{7}\right]$ is

(1) 7 cm (2) 3.25 cm
(3) 5.25 cm (4) 9 cm

(SSC CGL Tier-II Exam. 21.09.2014)

83. The base of a prism is a right angled triangle with two sides 5 cm and 12 cm. The height of the prism is 10 cm. The total surface area of the prism is

(1) 360 sq cm (2) 300 sq cm
(3) 330 sq cm (4) 325 sq cm

(SSC CGL Tier-II Exam. 21.09.2014)

84. The ratio of the length and breadth of a rectangular parallelopiped is 5 : 3 and its height is 6 cm. If the total surface area of the parallelopiped be 558 sq. cm, then its length in dm is

(1) 9 (2) 1.5
(3) 10 (4) 15

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

85. Deepali makes a model of a cylindrical kaleidoscope for her science project. She uses a chart paper to make it. If the length of the kaleidoscope is 25 cm and radius 3-5 cm, the area of the paper she used, in square cm, is $\left(\pi = \frac{22}{7}\right)$

(1) 1100 (2) 550
(3) 500 (4) 450

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

86. If the sum of the dimensions of a rectangular parallelopiped is 24 cm and the length of the diagonal is 15 cm, then the total surface area of it is

(1) 420 cm^2 (2) 275 cm^2
(3) 351 cm^2 (4) 378 cm^2

(SSC CHSL DEO & LDC Exam. 9.11.2014)

87. The length, breadth and height of a cuboid are in the ratio 3 : 4 : 6 and its volume is 576 cm^3. The whole surface of the cuboid is

(1) 216 cm^2 (2) 324 cm^2
(3) 432 cm^2 (4) 460 cm^2

(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

88. The radius of a right circular cone is 3 cm and its height is 4 cm. The total surface area of the cone is

(1) 48.4 sq.cm (2) 64.4 sq.cm
(3) 96.4 sq.cm (4) 75.4 sq.cm

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

89. There are two cones. The curved surface area of one is twice that of the other. The slant height of the latter is twice that of the former. The ratio of their radii is

(1) 4 : 1 (2) 4 : 3
(3) 3 : 4 (4) 1 : 4

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

90. From a solid right circular cylinder of length 4 cm and diameter 6 cm, a conical cavity of the same height and base is hollowed out. The whole surface of the remaining solid (in square cm.) is

(1) 48 π (2) 15 π
(3) 63 π (4) 24 π

(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

91. The length, breadth and height of a wooden box with a lid are 10 cm, 9 cm and 7 cm, respectively. The total inner surface of the closed box is 262 cm^2. The thickness of the wood (in cm.) is

(1) 2 (2) 3
(3) $\frac{23}{3}$ (4) 1

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

92. The total surface area of a regular triangular pyramid with each edge of length 1 cm is

(1) $4\sqrt{3}$ cm^2 (2) $\frac{4}{3}\sqrt{3}$ cm^2
(3) $\sqrt{3}$ cm^2 (4) 4 cm^2

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

93. The number of paving stones each measuring 2.5m × 2m required to pave a rectangular courtyard 30m long and 17.5 m wide, is

(1) 80 (2) 33
(3) 99 (4) 105

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

94. The length of canvas, 75 cm wide required to build a conical tent of height 14m and the floor area 346.5 m^2 is

(1) 665 m (2) 860 m
(3) 490 m (4) 770 m

(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

95. 5 persons will live in a tent. If each person requires 16m^2 of floor area and 100m^3 space for air then the height of the cone of smallest size to accommodate these persons would be

(1) 16 metre (2) 10.25 metre
(3) 20 metre (4) 18.75 metre

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

96. The paint in a certain container is sufficient to paint an area equal to 9.375 m^2. How many bricks measuring 22.5 cm by 10 cm by 7.5 cm can be painted out of this container?

(1) 200 (2) 1000
(3) 10 (4) 100

(SSC CGL Tier-I Re-Exam, 30.08.2015)

97. The ratio between the length and the breadth of a rectangular park is 3 : 2. If a man cycling along the boundary of the park at the speed of 12 kmph completes one round in 8 minutes, then the area of the park is equal to

(1) 152600 m^2 (2) 153500 m^2
(3) 153600 m^2 (4) 153800 m^2

(SSC CGL Tier-I Re-Exam, 30.08.2015)

98. The base of a right pyramid is a square of side 10 cm. If the height of the pyramid is 12 cm, then its total surface area is

(1) 400 cm^2 (2) 460 cm^2
(3) 260 cm^2 (4) 360 cm^2

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

99. There is a wooden sphere of radius $6\sqrt{3}$ cm. The surface area of the largest possible cube cut out from the sphere will be

(1) 864 cm^2 (2) $464\sqrt{3}$ cm^2
(3) 462 cm^2 (4) $646\sqrt{3}$ cm^2

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

100. A hemisphere and a cone have equal bases. If their heights are also equal, then the ratio of their curved surfaces will be

(1) 1 : 2 (2) 2 : 1
(3) 1 : $\sqrt{2}$ (4) $\sqrt{2}$: 1

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

101. The radius of base and curved surface area of a right cylinder is 'r' units and $4\pi rh$ square units respectively. The height of the cylinder is :

(1) $\frac{h}{2}$ units (2) h units
(3) $2h$ units (4) $4h$ units

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

102. A hemispherical bowl has 3.5 cm radius. It is to be painted inside as well as outside. The cost of painting it at the rate of Rs. 5 per 10 sq. cm will be:

(1) Rs. 77 (2) Rs. 100
(3) Rs. 175 (4) Rs. 50

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

103. The total surface area of a right circular cylinder with radius of the base 7 cm and height 20 cm, is:

(1) 900 cm^2 (2) 140 cm^2
(3) 1000 cm^2 (4) 1188 cm^2

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

104. If the radius of a sphere is increased by 2 cm, then its surface area increases by 352 cm^2. The radius of the sphere initially was :

$\left(\text{use } \pi = \frac{22}{7}\right)$

(1) 4 cm (2) 5 cm
(3) 3 cm (4) 6 cm

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

105. The diameter of a 120 cm long roller is 84 cm. It takes 500 complete revolutions of the roller to level a ground. The cost of levelling the ground at Rs. 1.50 per sq. m. is :

(1) Rs. 6000 (2) Rs. 3762
(3) Rs. 2376 (4) Rs. 5750

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

106. A hemispherical bowl has internal radius of 6 cm. The internal surface area would be : (Take π = 3.14)

(1) 225 cm^2 (2) 400 cm^2
(3) 289.75 cm^2 (4) 226.08 cm^2

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

107. The surface area of a sphere is 616 cm^2. The volume of the sphere would be :

(1) $1437\frac{1}{3}$ cm^2 (2) 2100 cm^2
(3) 2500 cm^2 (4) $1225\frac{3}{5}$ cm^2

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

108. Thousand solid metallic spheres of diameter 6 cm each are melted and recast into a new solid sphere. The diameter of the new sphere (in cm) is

(1) 30 (2) 90
(3) 45 (4) 60

(SSC CGL Tier-I (CBE) Exam.11.09.2016) (Ist Sitting)

109. The lateral surface area of frustum of a right circular cone, if the area of its base is 16π cm^2 and the diameter of circular upper surface is 4 cm and slant height is 6 cm, will be

(1) 30π cm^2 (2) 48π cm^2
(3) 36π cm^2 (4) 60π cm^2

(SSC CGL Tier-II Online Exam.01.12.2016)

110. The diameter of a sphere is twice the diameter of another sphere. The surface area of the first sphere is equal to the volume of the second sphere. The magnitude of the radius of the first sphere is

(1) 12 (2) 24
(3) 16 (4) 48

(SSC CGL Tier-II Online Exam.01.12.2016)

111. The area of the largest sphere (in cm^2) that can be drawn inside a square of side 18 cm is

(1) 972π (2) 1166π
(3) 36π (4) 288π

(SSC CHSL (10+2) Tier-I (CBE) Exam. 08.09.2016) (Ist Sitting)

112. The total surface area of a right pyramid on a square base of side 10 cm with height 12 cm is :

(1) 260 square cm
(2) 360 square cm
(3) 330 square cm
(4) 300 square cm

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

113. The base of a right prism, whose height is 2 cm, is a square. If the total surface area of the prism is 10 cm^2, then its volume is :

(1) 3 cm^3 (2) 1 cm^3
(3) 2 cm^3 (4) 4 cm^3

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

114. Let ABCDEF be a prism whose base is a right angled triangle, where sides adjacent to 90° are 9 cm and 12 cm. If the cost of painting the prism is Rs. 151.20, at the rate of 20 paise per sq cm then the height of the prism is :

(1) 17 cm (2) 18 cm
(3) 15 cm (4) 16 cm

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

115. A right circular cylindrical tunnel of diameter 5m and length 10m is to be constructed from a sheet of iron. The area of iron sheet required will be :

(1) 52π (2) 50π
(3) 51π (4) 49π

(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

116. If h, C, V are respectively the height, the curved surface and the volume of a cone, then

$3\pi Vh^3 - C^2h^2 + 9V^2 = ?$

(1) 0 (2) 3
(3) $\frac{1}{2}$ (4) 11

(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

117. The length of the two parallel sides of a trapezium are 16m and 20m respectively. If its height is 10m, its area in square metre is

(1) 360 (2) 260
(3) 240 (4) 180

(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (Ist Sitting)

118. Three medians AD, BE and CF of ΔABC intersect at G. The area of Δ ABC is 36 sq. cm. Then the area of Δ CGE is

(1) 12 sq. cm. (2) 6 sq. cm.
(3) 9 sq. cm. (4) 18 sq. cm.

(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (Ist Sitting)

119. The diagonal of a cuboid of length 5 cm, width 4 cm and height 3 cm is

(1) $5\sqrt{2}$ cm. (2) $2\sqrt{5}$ cm.
(3) 12 cm. (4) 10 cm.

(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (Ist Sitting)

120. A well of diameter 3m is dug 14m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4m to form an embankment. Find the height of the embankment.

(1) 4.25m (2) 2.25m
(3) 1.125m (4) 1.75m

(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

121. The diameter of a sphere is twice the diameter of another sphere. The curved surface area of the first and the volume of the second are numerically equal. The numerical value of the radius of the first sphere is

(1) 3 (2) 24
(3) 8 (4) 16

(SSC CGL Tier-I (CBE) Exam. 03.09.2016) (IInd Sitting)

122. A sphere has the same curved surface area as a cone of vertical height 40 cm and radius 30 cm. The radius of the sphere is

(1) $5\sqrt{5}$ cm (2) $5\sqrt{3}$ cm
(3) $5\sqrt{15}$ cm (4) $5\sqrt{10}$ cm

(SSC CGL Tier-I (CBE) Exam. 04.09.2016) (Ist Sitting)

123. The whole surface area of a pyramid whose base is a regular polygon is 340 cm.^{2} and area of its base is 100 cm^2. Area of each lateral face is 30 cm^2. Then the number of lateral faces is
(1) 8 (2) 9
(3) 7 (4) 10
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

124. A right circular conical structure stands on a circular base of 21 metre diameter and is 14 metre in height. The total cost of colour washing for its curved surface at Rs. 6 per square metre is $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) Rs. 4365 (2) Rs. 4465
(3) Rs. 3465 (4) Rs. 3365
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

125. If curved surface area of a cylinder is 1386 sq cm and height is 21 cm, what will be its radius? $\left(\text{Take } \pi = \frac{22}{7}\right)$
(1) 21 cm. (2) 5.25 cm.
(3) 10.5 cm. (4) 15.75 cm.
(SSC CHSL (10+2) Tier-I (CBE) Exam. 15.01.2017) (IInd Sitting)

126. The height and the total surface area of a right circular cylinder are 4 cm and 8π sq.cm. respectively. The radius of the base of cylinder is
(1) $\left(2\sqrt{2}-2\right)$ cm.
(2) $\left(2-\sqrt{2}\right)$ cm.
(3) 2 cm.
(4) $\sqrt{2}$ cm.
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

127. The radius of a cylindrical milk container is half its height and surface area of the inner part is 616 sq. cm. The amount of milk that the container can hold, approximately, is $\left[\text{Use : } \sqrt{5} = 2.23 \text{ and } \pi = \frac{22}{7}\right]$
(1) 1.42 litres (2) 1.53 litres
(3) 1.71 litres (4) 1.82 litres
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

128. A solid brass sphere of radius 2.1 dm is converted into a right circular cylindrical rod of length 7 cm. The ratio of total surface areas of the rod to the sphere is
(1) 3 : 1 (2) 1 : 3
(3) 7 : 3 (4) 3 : 7
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–VI

1. The circumference of the base of a circular cylinder is 6π cm. The height of the cylinder is equal to the diameter of the base. How many litres of water can it hold?
(1) 54 π cc (2) 36 π cc
(3) 0.054 π cc (4) 0.54 π cc
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

2. The diameter of the base of a cylindrical drum is 35 dm. and the height is 24 dm. It is full of kerosene. How many tins each of size 25 cm × 22 cm × 35 cm can be filled with kerosene from the drum?
(Use $\pi = \frac{22}{7}$)
(1) 1200 (2) 1020
(3) 600 (4) 120
(SSC CPO S.I. Exam. 07.09.2003)

3. Marbles of diameter 1.4 cm are dropped into a cylindrical beaker containing some water and are fully submerged. The diameter of the beaker is 7 cm. Find how many marbles have been dropped in it if the water rises by 5.6 cm ?
(1) 50 (2) 150
(3) 250 (4) 350
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

4. A right cylindrical vessel is full with water. How many right cones having the same diameter and height as that of the right cylinder will be needed to store that water ? (Take $\pi = \frac{22}{7}$).
(1) 4 (2) 2
(3) 3 (4) 5
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

5. How many cubes, each of edge 3 cm, can be cut from a cube of edge 15 cm?
(1) 25 (2) 27
(3) 125 (4) 144
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

6. A cuboidal block of 6 cm × 9 cm × 12 cm is cut up into exact number of equal cubes. The least possible number of cubes will be
(1) 6 (2) 9
(3) 24 (4) 30
(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

7. A soap cake is of size 8 cm × 5 cm × 4 cm. The number of such soap cakes that can be packed in a box measuring 56 cm × 35 cm × 28 cm is :
(1) 49 (2) 196
(3) 243 (4) 343
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

8. The cost of carpeting a room is ₹ 120. If the width had been 4 metres less, the cost of the Carpet would have been ₹ 20 less. The width of the room is :
(1) 24 m (2) 20 m
(3) 25 m (4) 18.5 m
(SSC CPO S.I. Exam. 26.05.2005)

9. A hall 25 metres long and 15 metres broad is surrounded by a verandah of uniform width of 3.5 metres. The cost of flooring the verandah, at ₹ 27.50 per square metre is
(1) ₹ 9149.50 (2) ₹ 8146.50
(3) ₹ 9047.50 (4) ₹ 4186.50
(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

10. A cube of edge 6 cm is painted on all sides and then cut into unit cubes. The number of unit cubes with no sides painted is
(1) 0 (2) 64
(3) 186 (4) 108
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

11. The height of a conical tank is 60 cm and the diameter of its base is 64cm. The cost of painting it from outside at the rate of ₹ 35 per sq. m. is :
(1) ₹ 52.00 approx.
(2) ₹ 39.20 approx.
(3) ₹ 35.20 approx.
(4) ₹ 23.94 approx.
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

12. Some solid metallic right circular cones, each with radius of the base 3 cm and height 4 cm, are melted to form a solid sphere of radius 6 cm. The number of right circular cones is
(1) 12 (2) 24
(3) 48 (4) 6
(SSC CPO S.I. Exam. 03.09.2006)

13. The diameter of a circular wheel is 7 m. How many revolutions will it make in travelling 22 km ?
(1) 100 (2) 400
(3) 500 (4) 1000
(SSC Graduate Level Tier-II Exam. 29.09.2013)

14. A spherical lead ball of radius 10cm is melted and small lead balls of radius 5mm are made. The total number of possible small lead balls is (Take $\pi = \frac{22}{7}$)
(1) 8000 (2) 400
(3) 800 (4) 125
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

15. The total number of spherical bullets, each of diameter 5 decimeter, that can be made by utilizing the maximum of a rectangular block of lead with 11 metre length, 10 metre breadth and 5 metre width is (assume that $\pi > 3$)
(1) equal to 8800
(2) less than 8800
(3) equal to 8400
(4) greater than 9000
(SSC Graduate Level Tier-II Exam. 29.09.2013)

16. A solid metallic cone of height 10 cm, radius of base 20 cm is melted to make spherical balls each of 4 cm diameter. How many such balls can be made ?
(1) 25 (2) 75
(3) 50 (4) 125
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

17. A cylindrical rod of iron whose height is eight times its radius is melted and cast into spherical balls each of half the radius of the cylinder. The number of such spherical balls is
(1) 12 (2) 16
(3) 24 (4) 48
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

18. The number of spherical bullets that can be made out of a solid cube of lead whose edge measures 44 cm, each bullet being of 4 cm diameter, is (take $\pi = \frac{22}{7}$)
(1) 2541 (2) 2451
(3) 2514 (4) 2415
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

19. The radius of a metallic cylinder is 3 cm and its height is 5 cm. It is melted and moulded into small cones, each of height 1 cm and base radius 1 mm. The number of such cones formed, is
(1) 450 (2) 1350
(3) 8500 (4) 13500
(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

20. If a metallic cone of radius 30 cm and height 45 cm is melted and recast into metallic spheres of radius 5 cm, find the number of spheres.
(1) 81 (2) 41
(3) 80 (4) 40
(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

21. Water flows at the rate of 10 metres per minute from a cylindrical pipe 5 mm in diameter. How long it take to fill up a conical vessel whose diameter at the base is 30 cm and depth 24 cm ?
(1) 28 minutes 48 seconds
(2) 51 minutes 12 seconds
(3) 51 minutes 24 seconds
(4) 28 minutes 36 seconds
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

22. A metallic sphere of radius 10.5 cm is melted and then recast into small cones each of radius 3.5 cm and height 3 cm. The number of cones thus formed is
(1) 140 (2) 132
(3) 112 (4) 126
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

23. The radius of the base of a Conical tent is 12 m. The tent is 9 m high. Find the cost of canvas required to make the tent, if one square metre of canvas costs ₹ 120
(Take $\pi = 3.14$)
(1) ₹ 67, 830 (2) ₹ 67, 800
(3) ₹ 67, 820 (4) ₹ 67, 824
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

24. If the radius of a cylinder is decreased by 50 % and the height is increased by 50 %, then the change in volume is
(1) 52.5 % (2) 67.5 %
(3) 57.5 % (4) 62.5 %
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

25. The base of a triangle is increased by 10%. To keep the area unchanged the height of the triangle is to be decreased by
(1) $9\frac{1}{11}$% (2) $11\frac{1}{9}$%
(3) 11% (4) 9%
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

26. If the area of the base of a cone is increased by 100%, then the volume increases by
(1) 200% (2)182%
(3) 141% (4) 100%
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

27. The percentage increase in the surface area of a cube when each side is doubled is
(1) 50% (2) 200%
(3) 150% (4) 300%
(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

28. Each side of a cube is decreased by 25%. Find the ratio of the volumes of the original cube and the resulting cube.
(1) 8 : 1 (2) 27 : 64
(3) 64 : 1 (4) 64 : 27
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

29. If water is freezed to become ice, its volume is increased by 10%, then if the ice is melted to water again, its volume will be decreased by :
(1) 9% (2) $9\frac{1}{11}$%
(3) 8% (4) $9\frac{1}{2}$%
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

30. If the radius of a right circular cylinder open at both the ends, is decreased by 25% and the height of the cylinder is increased by 25%. Then the curved surface area of the cylinder thus formed
(1) remains unaltered
(2) is increased by 25%
(3) is increased by 6.25%
(4) is decreased by 6.25%
(SSC CGL Tier-II Online Exam.01.12.2016)

31. The amount of concrete required to build a concrete cylindrical pillar whose base has a perimeter 8.8 metre and curved surface area 17.6 square metre, is

$\left(\text{Take } \pi = \frac{22}{7}\right)$

(1) 8.325 m^3 (2) 9.725 m^3
(3) 10.5 m^3 (4) 12.32 m^3

(SSC CGL Tier-II Online Exam.01.12.2016)

32. A big cube is formed by arranging the 160 coloured and 56 non-coloured similar cubes in such a way that the exposure of the coloured cubes to the outside is minimum. The percentage of exposed area that is coloured is

(1) 25.9% (2) 44.44%
(3) 35% (4) 46%

(SSC CPO Exam. 06.06.2016) (Ist Sitting)

33. If the radius of the base, and the height of a right circular cone are increased by 20%, what is the approximate percentage increase in volume ?

(1) 60 (2) 68.8
(3) 72.8 (4) 75

(SSC CPO Exam. 06.06.2016) (Ist Sitting)

34. Which of the the following statements is not correct?

(1) For a given radius and height, a right circular cone has the lesser volume among a right circular cone and a right circular cylinder.
(2) If side of a cube is increased by 10%, the volume will increase by 33.1%.
(3) If the radius of a sphere is increased by 20%, the surface area will increase by 40%.
(4) Cutting a sphere into 2 parts does not change the total volume.

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

35. There is a 4% increase in volume when a liquid freezes to its solid state. The percentage decrease when solid melts to liquid again, is

(1) $3\frac{3}{13}\%$ (2) 4%
(3) $4\frac{1}{13}\%$ (4) $3\frac{11}{13}\%$

(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IInd Sitting)

36. An inverted conical shaped vessel is filled with water to its brim. The height of the vessel is 8 cm and radius of the open end is 5 cm. When a few solid spherical metallic balls each of radius $\frac{1}{2}$ cm are dropped in the vessel, 25% water is overflowed. The number of balls is :

(1) 100 (2) 400
(3) 200 (4) 150

(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IInd Sitting)

37. The radius and the height of a cone are each increased by 20%. Then the volume of the cone increases by

(1) 20% (2) 20.5%
(3) 62% (4) 72.8%

(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IIIrd Sitting)

TYPE - VII

1. If the arcs of square length in two circles subtend angles of 60° and 75° at their centres, the ratio of their radii is

(1) 3 : 4 (2) 4 : 5
(3) 5 : 4 (4) 3 : 5

(SSC Graduate Level Tier-I Exam. 21.04.2013)

2. The length of the perpendiculars drawn from any point in the interior of an equilateral triangle to the respective sides are p_1, p_2 and p_3. The length of each side of the triangle is

(1) $\frac{2}{\sqrt{3}}(p_1 + p_2 + p_3)$

(2) $\frac{1}{3}(p_1 + p_2 + p_3)$

(3) $\frac{1}{\sqrt{3}}(p_1 + p_2 + p_3)$

(4) $\frac{4}{\sqrt{3}}(p_1 + p_2 + p_3)$

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

3. The sides of a triangle are in the ratio 3 : 4 : 5. The measure of the largest angle of the triangle is

(1) 60° (2) 90°
(3) 120° (4) 150°

(SSC CPO S.I. Exam. 05.09.2004)

4. From a point within an equilateral triangle, perpendiculars drawn to the three sides, are 6 cm, 7 cm and 8 cm respectively. the length of the side of the triangle is :

(1) 7 cm (2) 10.5 cm
(3) $14\sqrt{3}$ cm (4) $\frac{14\sqrt{3}}{3}$ cm

(SSC CPO S.I. Exam. 26.05.2005)

5. The base and altitude of a right angled triangle are 12 cm and 5 cm respectively. The perpendicular distance of its hypotenuse from the opposite vertex is

(1) $4\frac{4}{13}$ cm (2) $4\frac{8}{13}$ cm
(3) 5 cm (4) 7 cm

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

6. One acute angle of a right angled triangle is double the other. If the length of its hypotenuse is 10 cm, then its area is

(1) $\frac{25}{2}\sqrt{3}$ cm^2 (2) 25 cm^2
(3) $25\sqrt{3}$ cm^2 (4) $\frac{75}{2}$ cm^2

(SSC CPO S.I. Exam. 09.11.2008)

7. In an equilateral triangle ABC of side 10cm, the side BC is trisected at D. Then the length (in cm) of AD is

(1) $3\sqrt{7}$ (2) $7\sqrt{3}$
(3) $\frac{10\sqrt{7}}{3}$ (4) $\frac{7\sqrt{10}}{3}$

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

8. The perimeter of a triangle is 40cm and its area is 60 cm^2. If the largest side measures 17cm, then the length (in cm) of the smallest side of the triangle is

(1) 4 (2) 6
(3) 8 (4) 15

(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

9. The ratio of the area of two isosceles triangles having the same vertical angle (i.e. angle between equal sides) is 1 : 4. The ratio of their heights is

(1) 1 : 4 (2) 2 : 5
(3) 1 : 2 (4) 3 : 4

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

10. The length of one side of a rhombus is 6.5 cm and its altitude is 10 cm. If the length of its diagonal be 26 cm, the length of the other diagonal will be :

(1) 5 cm (2) 10 cm
(3) 6.5 cm (4) 26 cm

(SSC CPO S.I. Exam. 26.05.2005)

11. The measure of each of two opposite angles of a rhombus is 60° and the measure of one of its sides is 10cm. The length of its smaller diagonal is :

(1) 10 cm (2) $10\sqrt{3}$ cm
(3) $10\sqrt{2}$ cm (4) $\frac{5}{2}\sqrt{2}$ cm

(SSC CPO S.I. Exam. 16.12.2007)

12. Two adjacent sides of a parallelogram are of length 15 cm and 18 cm. If the distance between two smaller sides is 12 cm, then the distance between two bigger sides is

(1) 8 cm (2) 10 cm
(3) 12 cm (4) 15 cm

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

13. A parallelogram ABCD has sides AB = 24 cm and AD = 16 cm. The distance between the sides AB and DC is 10 cm. Find the distance between the sides AD and BC.

(1) 16 cm. (2) 18 cm.
(3) 15 cm. (4) 26 cm.

(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone)

14. The adjacent sides of a parallelogram are 36 cm and 27 cm in length. If the distance between the shorter sides is 12 cm, then the distance between the longer sides is

(1) 10 cm (2) 12 cm
(3) 16 cm (4) 9 cm

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

15. If the diagonals of a rhombus are 8 and 6, then the square of its size is

(1) 25 (2) 55
(3) 64 (4) 36

(SSC Graduate Level Tier-II Exam.16.09.2012)

16. One of the four angles of a rhombus is 60°. If the length of each side of the rhombus is 8 cm, then the length of the longer diagonal is

(1) $8\sqrt{3}$ cm (2) 8 cm
(3) $4\sqrt{3}$ cm (4) $\frac{8}{\sqrt{3}}$ cm

(SSC Graduate Level Tier-I Exam. 21.04.2013)

17. The diagonals of a rhombus are 12 cm and 16 cm respectively. The length of one side is

(1) 8 cm (2) 6 cm
(3) 10 cm (4) 12 cm

(SSC Graduate Level Tier-II Exam. 29.09.2013)

18. Each interior angle of a regular polygon is 18° more than eight times an exterior angle. The number of sides of the polygon is

(1) 10 (2) 15
(3) 20 (4) 25

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

19. An exterior angle of a regular polygon is 72°. The sum of all the interior angles is

(1) 360° (2) 480°
(3) 520° (4) 540°

(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

20. A cylindrical tank of diameter 35 cm is full of water. If 11 litres of water is drawn off, the water level in the tank will drop by :

$\left(\text{use } \pi = \frac{22}{7}\right)$

(1) $10\frac{1}{2}$ cm. (2) $12\frac{6}{7}$ cm.
(3) 14 cm. (4) $11\frac{3}{7}$ cm.

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

21. A right circular cylinder is formed by rolling a rectangular paper 12 cm long and 3 cm wide along its length. The radius of the base of the cylinder will be

(1) $\frac{3}{2\pi}$ cm (2) $\frac{6}{\pi}$ cm
(3) $\frac{9}{2\pi}$ cm (4) 2π cm

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

22. The diameter of the base of a right circular cone is 4 cm and its height $2\sqrt{3}$ cm. The slant height of the cone is

(1) 5 cm (2) 4 cm
(3) $2\sqrt{3}$ cm (4) 3 cm

(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

23. A sector is formed by opening out a cone of base radius 8 cm and height 6 cm. Then the radius of the sector is (in cm)

(1) 4 (2) 8
(3) 10 (4) 6

(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

24. A right circular cone is 3.6 cm high and radius of its base is 1.6 cm. It is melted and recast into a right circular cone with radius of its base as 1.2 cm. Then the height of the cone (in cm) is

(1) 3.6 (2) 4.8
(3) 6.4 (4) 7.2

(SSC Graduate Level Tier-II Exam. 29.09.2013)

25. A copper sphere of radius 3 cm is beaten and drawn into a wire of diameter 0.2 cm. The length of the wire is :

(1) 9 m (2) 12 m
(3) 18 m (4) 36 m

(SSC CPO S.I. Exam. 26.05.2005)

26. If surface area and volume of a sphere are S and V respectively, then value of $\frac{S^3}{V^2}$ is

(1) 36 units (2) 9 units
(3) 18 units (4) 27 units

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

27. Assume that a drop of water is spherical and its diameter is one-tenth of a cm. A conical glass has a height equal to the diameter of its rim. If 32,000 drops of water fill the glass completely, then the height of the glass (in cm) is

(1) 1 (2) 2
(3) 3 (4) 4

(SSC Graduate Level Tier-II Exam. 29.09.2013

28. A cistern of capacity 8000 litres measures externally 3.3 m by 2.6 m by 1.1 m and its walls are 5 cm thick. The thickness of the bottom is :

(1) 1 m (2) 1.1 m
(3) 1 dm (4) 90 cm

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

29. A cone is cut at mid point of its height by a frustum parallel to its base. The ratio between the two parts of cone would be

(1) 1 : 1 (2) 1 : 8
(3) 1 : 4 (4) 1 : 7

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

30. The area of a circle of radius 5 is numerically what percent of its circum ference?

(1) 200% (2) 225%
(3) 240% (4) 250%

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

31. If the circumference and area of a circle are numerically equal, then the diameter is equal to :

(1) area of the circle
(2) $\frac{\pi}{2}$
(3) 2π (4) 4

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

32. A chord of length 30 cm is at a distance of 8 cm from the centre of a circle. The radius of the circle is:

(1) 17 cm (2) 23 cm
(3) 21 cm (4) 19 cm

(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

33. The circum-radius of an equilateral triangle is 8 cm. The in-radius of the triangle is

(1) 3.25 cm (2) 3.50 cm
(3) 4 cm (4) 4.25 cm

(SSC CPO S.I. Exam. 07.09.2003)

34. A circle is inscribed in a square. An equilateral triangle of side $4\sqrt{3}$ cm is inscribed in that circle. The length of the diagonal of the square (in centimetres) is

(1) $4\sqrt{2}$ (2) 8
(3) $8\sqrt{2}$ (4) 16

(SSC CPO S.I. Exam. 05.09.2004)

35. The height of an equilateral triangle is $4\sqrt{3}$ cm. The ratio of the area of its circumcircle to that of its in-circle is

(1) 2 : 1 (2) 4 : 1
(3) 4 : 3 (4) 3 : 2

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

36. A circle is inscribed in a square whose length of the diagonal is $12\sqrt{2}$ cm. An equilateral triangle is inscribed in that circle. The length of the side of the triangle is

(1) $4\sqrt{3}$ cm (2) $8\sqrt{3}$ cm
(3) $6\sqrt{3}$ cm (4) $11\sqrt{3}$ cm

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

37. The radius of the incircle of a triangle whose sides are 9 cm, 12 cm and 15 cm is

(1) 9 cm (2) 13 cm
(3) 3 cm (4) 6 cm

(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

38. The ratio of inradius and circumradius of a square is :

(1) $1 : \sqrt{2}$ (2) $\sqrt{2} : \sqrt{3}$
(3) 1 : 3 (4) 1 : 2

(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

39. The perimeter of a rectangle and a square are 160 m each. The area of the rectangle is less than that of the square by 100 sq m. The length of the rectangle is

(1) 30 m (2) 60 m
(3) 40 m (4) 50 m

(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

40. The volume of a right circular cylinder and that of a sphere are equal and their radii are also equal. If the height of the cylinder be h and the diameter of the sphere d, then which of the following relation is correct ?

(1) $h = d$ (2) $2h = d$
(3) $2h = 3d$ (4) $3h = 2d$

(SSC CPO S.I. Exam. 09.11.2008)

41. A solid cone of height 9 cm with diameter of its base 18 cm is cut out from a wooden solid sphere of radius 9 cm. The percentage of wood wasted is :

(1) 25% (2) 30%
(3) 50% (4) 75%

(FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

42. Two circles with centres A and B and radius 2 units touch each other externally at 'C'. A third circle with centre 'C' and radius '2' units meets other two at D and E. Then the area of the quadrilateral ABDE is

(1) $2\sqrt{2}$ sq. units
(2) $3\sqrt{3}$ sq. units
(3) $3\sqrt{2}$ sq. units
(4) $2\sqrt{3}$ sq. units

(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

43. Two cubes of sides 6 cm each are kept side by side to form a rectangular parallelopiped. The area (in sq. cm) of the whole surface of the rectangular parallelopiped is

(1) 432 (2) 360
(3) 396 (4) 340

(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

44. The diameter of a copper sphere is 1 8 cm. The sphere is melted and is drawn into a long wire of uniform circular cross-section. If the length of the wire is 108 m, the diameter of the wire is

(1) 1 cm (2) 0.9cm
(3) 0.3 cm (4) 0.6 cm

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

45. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water (in litres) will fall into the sea in a minute?

(1) 4,00,000 (2) 40,00,000
(3) 40,000 (4) 4,000

(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

46. Water is flowing at the rate of 3 km/hr through a circular pipe of 20 cm internal diameter into a circular cistern of diameter 10m and depth 2m. In how much time will the cistern be filled ?
(1) 1 hour
(2) 1 hour 40 minutes
(3) 1 hour 20 minutes
(4) 2 hours 40 minutes
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

47. The rain water from a roof 22 m × 20 m drains into a cylindrical vessel having a diameter of 2 m and height 3.5 m. If the vessel is just full, then the rainfall (in cm) is :
(1) 2 (2) 2.5
(3) 3 (4) 4.5
(SSC CHSL DEO & LDC Exam. 27.11.2010)

48. 2 cm of rain has fallen on a square km of land. Assuming that 50% of the raindrops could have been collected and contained in a pool having a 100 m × 10 m base, by what level would the water level in the pool have increased ?
(1) 1 km (2) 10 m
(3) 10 cm (4) 1 m
(SSC Graduate Level Tier-II Exam.16.09.2012)

49. A parallelopiped whose sides are in ratio 2 : 4 : 8 have the same volume as a cube. The ratio of their surface area is :
(1) 7 : 5 (2) 4 : 3
(3) 8 : 5 (4) 7 : 6
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

50. If two adjacent sides of a rectangular parallelopiped are 1 cm and 2 cm and the total surface area of the parallelopiped is 22 square cm, then the diagonal of the parallelopiped is
(1) $\sqrt{10}$ cm (2) $2\sqrt{3}$ cm
(3) $\sqrt{14}$ cm (4) 4cm
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

51. What part of a ditch, 48 metres long, 16.5 metres broad and 4 metres deep can be filled by the earth got by digging a cylindrical tunnel of diameter 4 metres and length 56 metres ? (Use $\pi = \frac{22}{7}$)
(1) $\frac{1}{9}$ (2) $\frac{2}{9}$
(3) $\frac{7}{9}$ (4) $\frac{8}{9}$
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

52. The perimeters of a circle, a square and an equilateral triangle are same and their areas are C, S and T respectively. Which of the following statement is true ?
(1) C = S = T (2) C > S > T
(3) C < S < T (4) S < C < T
(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

53. The base of a right prism is a quadrilateral ABCD. Given that AB = 9 cm, BC = 14 cm, CD = 13 cm, DA = 12 cm and $\angle DAB = 90°$. If the volume of the prism be 2070 cm^3, then the area of the lateral surface is
(1) 720 cm^2 (2) 810 cm^2
(3) 1260 cm^2 (4) 2070 cm^2
(SSC CGL Tier-I Exam. 19.10.2014)

54. An elephant of length 4 m is at one corner of a rectangular cage of size (16 m × 30 m) and faces towards the diagonally opposite corner. If the elephant starts moving towards the diagonally opposite corner it takes 15 seconds to reach this corner. Find the speed of the elephant.
(1) 1 m/sec (2) 2 m/sec
(3) 1.87 m/sec (4) 1.5 m/sec
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

55. A horse takes $2\frac{1}{2}$ seconds to complete a round around a circular field. If the speed of the horse was 66 m/sec, then the radius of the field is,
[Given $\pi = \frac{22}{7}$]
(1) 25.62 m (2) 26.52 m
(3) 25.26 m (4) 26.25 m
(SSC CHSL DEO & LDC Exam. 9.11.2014)

56. The diameter of the front wheel of an engine is $2x$ cm and that of rear wheel is $2y$ cm. To cover the same distance, find the number of times the rear wheel will revolve when the front wheel revolves 'n' times.
(1) $\frac{n}{xy}$ times (2) $\frac{yn}{x}$ times
(3) $\frac{nx}{y}$ times (4) $\frac{xy}{n}$ times
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

57. A bicycle wheel has a diameter (including the tyre) of 56 cm. The number of times the wheel will rotate to cover a distance of 2.2 km is (Assume $\pi = \frac{22}{7}$)
(1) 625 (2) 1250
(3) 1875 (4) 2500
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

58. If one diagonal of a rhombus of side 13 cm is 10 cm, then the other diagonal is
(1) 24 cm (2) 20 cm
(3) 16 cm (4) 28 cm
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

59. A brick 2" thick is placed against a wheel to act for a stop. The horizontal distance of the face of the brick from the point where the wheel touches the ground is 6". The radius of the wheel in inches is
(1) 10 (2) 5
(3) 12 (4) 6
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

60. A solid has 12 vertices and 30 edges. How many faces does it have?
(1) 22 (2) 24
(3) 26 (4) 20
(SSC CHSL (10+2) Tier-I (CBE) Exam. 15.01.2017) (IInd Sitting)

SHORT ANSWERS

TYPE-I

1. (2)	**2.** (3)	**3.** (4)	**4.** (3)
5. (2)	**6.** (3)	**7.** (3)	**8.** (2)
9. (2)	**10.** (4)	**11.** (1)	**12.** (1)
13. (1)	**14.** (1)	**15.** (2)	**16.** (4)
17. (4)	**18.** (3)	**19.** (4)	**20.** (1)
21. (2)	**22.** (2)	**23.** (3)	**24.** (1)
25. (3)	**26.** (1)	**27.** (1)	**28.** (4)
29. (4)	**30.** (4)	**31.** (2)	**32.** (3)
33. (3)	**34.** (3)	**35.** (2)	**36.** (3)
37. (3)	**38.** (3)	**39.** (3)	**40.** (2)
41. (4)	**42.** (3)	**43.** (1)	**44.** (3)
45. (4)	**46.** (4)	**47.** (2)	**48.** (1)
49. (4)	**50.** (3)	**51.** (1)	**52.** (3)
53. (3)	**54.** (2)	**55.** (2)	**56.** (1)
57. (3)	**58.** (3)	**59.** (2)	**60.** (3)
61. (3)	**62.** (4)	**63.** (4)	**64.** (2)
65. (1)	**66.** (2)	**67.** (3)	**68.** (3)
69. (4)	**70.** (3)	**71.** (2)	**72.** (2)
73. (4)	**74.** (4)	**75.** (4)	**76.** (3)
77. (4)	**78.** (1)	**79.** (4)	**80.** (1)
81. (1)	**82.** (3)	**83.** (3)	**84.** (2)
85. (4)	**86.** (3)	**87.** (2)	**88.** (2)
89. (1)	**90.** (2)	**91.** (2)	**92.** (2)
93. (1)	**94.** (3)	**95.** (3)	**96.** (1)
97. (1)	**98.** (1)	**99.** (4)	**100.** (2)
101. (1)	**102.** (1)	**103.** (4)	**104.** (1)
105. (1)	**106.** (3)	**107.** (1)	**108.** (4)
109. (4)	**110.** (3)	**111.** (1)	**112.** (2)
113. (1)	**114.** (1)	**115.** (2)	**116.** (2)
117. (3)	**118.** (3)	**119.** (4)	**120.** (2)
121. (3)	**122.** (2)	**123.** (1)	**124.** (2)
125. (4)	**126.** (3)	**127.** (3)	**128.** (3)
129. (2)	**130.** (2)	**131.** (4)	**132.** (2)
133. (1)	**134.** (2)	**135.** (2)	**136.** (4)
137. (3)	**138.** (3)	**139.** (4)	**140.** (2)
141. (3)	**142.** (3)	**143.** (2)	**144.** (4)
145. (3)	**146.** (2)	**147.** (3)	**148.** (2)
149. (3)	**150.** (4)	**151.** (4)	**152.** (1)
153. (2)	**154.** (2)	**155.** (3)	**156.** (4)
157. (2)	**158.** (2)	**159.** (1)	**160.** (2)
161. (2)	**162.** (4)	**163.** (3)	**164.** (4)
165. (4)	**166.** (1)	**167.** (1)	**168.** (3)
169. (3)	**170.** (3)	**171.** (3)	**172.** (2)
173. (3)	**174.** (2)	**175.** (1)	**176.** (4)
177. (1)	**178.** (2)	**179.** (2)	**180.** (2)
181. (3)	**182.** (4)	**183.** (2)	**184.** (3)
185. (1)	**186.** (4)	**187.** (2)	**188.** (3)
189. (3)	**190.** (2)	**191.** (2)	**192.** (4)
193. (1)	**194.** (4)	**195.** (1)	**196.** (3)
197. (4)	**198.** (3)	**199.** (1)	**200.** (4)
201. (1)	**202.** (1)	**203.** (4)	**204.** (2)
205. (*)	**206.** (3)	**207.** (2)	**208.** (2)
209. (1)	**210.** (2)	**211.** (2)	**212.** (2)
213. (1)	**214.** (2)	**215.** (3)	**216.** (3)
217. (3)	**218.** (1)	**219.** (3)	**220.** (3)
221. (3)	**222.** (4)	**223.** (4)	**224.** (1)
225. (1)	**226.** (3)	**227.** (2)	**228.** (3)
229. (3)	**230.** (1)	**231.** (1)	**232.** (2)
233. (3)	**234.** (4)	**235.** (3)	**236.** (2)
237. (1)	**238.** (4)	**239.** (4)	**240.** (2)
241. (4)	**242.** (3)	**243.** (4)	**244.** (2)
245. (2)	**246.** (1)	**247.** (4)	**248.** (4)
249. (2)	**250.** (2)	**251.** (4)	**252.** (3)
253. (4)	**254.** (2)	**255.** (2)	**256.** (3)
257. (4)	**258.** (3)	**259.** (1)	**260.** (2)
261. (1)	**262.** (1)	**263.** (3)	**264.** (1)
265. (2)	**266.** (2)	**267.** (4)	**268.** (3)
269. (4)	**270.** (2)	**271.** (3)	**272.** (1)
273. (2)	**274.** (3)	**275.** (2)	**276.** (1)
277. (1)	**278.** (4)	**279.** (4)	**280.** (2)
281. (2)	**282.** (4)	**283.** (4)	**284.** (3)
285. (4)	**286.** (4)	**287.** (4)	**288.** (3)
289. (2)	**290.** (2)	**291.** (3)	**292.** (1)
293. (2)	**294.** (2)	**295.** (1)	**296.** (1)
297. (4)	**298.** (2)	**299.** (1)	**300.** (1)
301. (1)	**302.** (3)	**303.** (2)	**304.** (4)
305. (2)	**306.** (4)	**307.** (3)	**308.** (1)
309. (3)	**310.** (1)	**311.** (2)	**312.** (2)
313. (1)	**314.** (3)	**315.** (2)	**316.** (3)
317. (1)	**318.** (2)	**319.** (2)	**320.** (3)
321. (1)			

TYPE-II

1. (2)	**2.** (1)	**3.** (3)	**4.** (2)
5. (2)	**6.** (3)	**7.** (2)	**8.** (4)
9. (3)	**10.** (1)	**11.** (4)	**12.** (3)
13. (1)	**14.** (3)	**15.** (3)	**16.** (4)
17. (3)	**18.** (1)	**19.** (3)	**20.** (3)
21. (1)	**22.** (1)	**23.** (3)	**24.** (1)
25. (4)	**26.** (1)	**27.** (4)	**28.** (3)
29. (3)	**30.** (1)	**31.** (2)	**32.** (1)
33. (2)	**34.** (3)	**35.** (2)	**36.** (2)
37. (1)	**38.** (1)	**39.** (1)	**40.** (2)
41. (4)	**42.** (3)	**43.** (2)	**44.** (2)
45. (3)	**46.** (1)	**47.** (2)	**48.** (2)
49. (2)	**50.** (3)	**51.** (2)	**52.** (1)
53. (2)	**54.** (1)	**55.** (4)	**56.** (1)
57. (2)	**58.** (3)	**59.** (3)	**60.** (3)
61. (2)	**62.** (3)	**63.** (2)	**64.** (4)
65. (1)	**66.** (3)	**67.** (4)	**68.** (2)
69. (1)	**70.** (1)	**71.** (3)	**72.** (1)
73. (3)	**74.** (1)	**75.** (1)	**76.** (1)
77. (1)	**78.** (2)	**79.** (2)	**80.** (2)
81. (2)	**82.** (2)	**83.** (1)	**84.** (3)
85. (1)	**86.** (2)	**87.** (3)	**88.** (1)
89. (2)	**90.** (3)	**91.** (3)	**92.** (4)
93. (2)	**94.** (3)	**95.** (2)	**96.** (3)
97. (3)	**98.** (1)	**99.** (2)	**100.** (1)
101. (4)	**102.** (2)	**103.** (2)	

TYPE-III

1. (4)	**2.** (2)	**3.** (3)	**4.** (3)
5. (4)	**6.** (1)	**7.** (4)	**8.** (1)
9. (4)	**10.** (4)	**11.** (3)	**12.** (4)
13. (4)	**14.** (4)	**15.** (2)	

TYPE-IV

1. (2)	**2.** (1)	**3.** (1)	**4.** (1)
5. (4)	**6.** (2)	**7.** (4)	**8.** (3)
9. (1)	**10.** (2)	**11.** (2)	**12.** (3)
13. (1)	**14.** (2)	**15.** (1)	**16.** (1)
17. (4)	**18.** (3)	**19.** (1)	**20.** (1)
21. (3)	**22.** (1)	**23.** (2)	**24.** (4)

25. (4)	**26.** (4)	**27.** (1)	**28.** (1)
29. (3)	**30.** (3)	**31.** (2)	**32.** (1)
33. (1)	**34.** (4)	**35.** (1)	**36.** (4)
37. (4)	**38.** (2)	**39.** (3)	**40.** (2)
41. (3)	**42.** (4)	**43.** (1)	**44.** (1)
45. (2)	**46.** (4)	**47.** (4)	**48.** (4)
49. (2)	**50.** (3)	**51.** (1)	**52.** (4)
53. (1)	**54.** (3)	**55.** (2)	**56.** (1)
57. (2)	**58.** (3)	**59.** (2)	**60.** (3)
61. (4)	**62.** (2)	**63.** (3)	**64.** (2)
65. (4)	**66.** (4)	**67.** (2)	**68.** (4)
69. (3)	**70.** (4)	**71.** (1)	**72.** (1)
73. (3)	**74.** (3)	**75.** (3)	**76.** (3)
77. (3)	**78.** (2)	**79.** (4)	**80.** (1)
81. (1)	**82.** (3)	**83.** (2)	**84.** (2)
85. (2)	**86.** (2)	**87.** (1)	**88.** (3)
89. (1)	**90.** (3)	**91.** (1)	**92.** (1)
93. (2)	**94.** (4)	**95.** (3)	**96.** (2)
97. (3)	**98.** (3)	**99.** (3)	**100.** (2)
101. (2)	**102.** (2)	**103.** (2)	**104.** (4)
105. (2)	**106.** (1)	**107.** (3)	**108.** (1)
109. (4)	**110.** (4)	**111.** (4)	**112.** (2)
113. (4)	**114.** (3)	**115.** (1)	**116.** (1)
117. (2)	**118.** (1)	**119.** (4)	**120.** (2)
121. (2)	**122.** (3)	**123.** (2)	**124.** (1)
125. (4)	**126.** (4)	**127.** (4)	**128.** (3)
129. (2)	**130.** (1)	**131.** (3)	**132.** (2)
133. (1)	**134.** (4)	**135.** (2)	**136.** (3)
137. (2)	**138.** (4)	**139.** (4)	**140.** (2)
141. (2)	**142.** (1)	**143.** (4)	**144.** (2)
145. (3)	**146.** (4)	**147.** (1)	**148.** (3)
149. (1)	**150.** (1)	**151.** (1)	**152.** (1)
153. (4)	**154.** (2)	**155.** (2)	**156.** (1)
157. (1)	**158.** (4)	**159.** (4)	**160.** (1)
161. (3)	**162.** (3)	**163.** (4)	**164.** (1)
165. (2)	**166.** (4)	**167.** (*)	**168.** (2)
169. (4)	**170.** (4)	**171.** (3)	**172.** (3)
173. (1)	**174.** (*)	**175.** (1)	**176.** (1)
177. (1)	**178.** (4)	**179.** (1)	**180.** (1)
181. (3)	**182.** (3)	**183.** (2)	**184.** (2)
185. (4)	**186.** (4)	**187.** (3)	**188.** (2)
189. (1)	**190.** (3)	**191.** (3)	**192.** (1)

193. (4)	**194.** (1)	**195.** (3)	**196.** (2)
197. (3)	**198.** (3)	**199.** (2)	**200.** (4)
201. (4)	**202.** (1)	**203.** (4)	**204.** (4)
205. (3)	**206.** (2)	**207.** (4)	**208.** (4)
209. (2)	**210.** (1)	**211.** (1)	**212.** (2)
213. (1)	**214.** (2)	**215.** (3)	**216.** (1)
217. (4)	**218.** (4)	**219.** (3)	**220.** (1)
221. (4)	**222.** (2)	**223.** (3)	**224.** (4)
225. (2)	**226.** (3)	**227.** (3)	**228.** (4)
229. (4)	**230.** (3)	**231.** (4)	**232.** (3)
233. (2)	**234.** (4)	**235.** (3)	**236.** (1)
237. (3)	**238.** (1)	**239.** (3)	**240.** (3)
241. (4)	**242.** (4)	**243.** (3)	**244.** (3)
245. (1)	**246.** (3)	**247.** (2)	**248.** (4)
249. (1)	**250.** (1)	**251.** (4)	**252.** (2)
253. (1)	**254.** (2)	**255.** (1)	**256.** (4)
257. (4)	**258.** (2)	**259.** (1)	**260.** (4)
261. (4)			

TYPE-V

1. (4)	**2.** (2)	**3.** (1)	**4.** (2)
5. (1)	**6.** (1)	**7.** (1)	**8.** (1)
9. (3)	**10.** (3)	**11.** (3)	**12.** (3)
13. (1)	**14.** (2)	**15.** (4)	**16.** (3)
17. (4)	**18.** (3)	**19.** (2)	**20.** (2)
21. (1)	**22.** (4)	**23.** (3)	**24.** (3)
25. (2)	**26.** (3)	**27.** (2)	**28.** (4)
29. (2)	**30.** (3)	**31.** (3)	**32.** (3)
33. (2)	**34.** (2)	**35.** (1)	**36.** (3)
37. (4)	**38.** (2)	**39.** (4)	**40.** (4)
41. (4)	**42.** (4)	**43.** (2)	**44.** (2)
45. (3)	**46.** (3)	**47.** (2)	**48.** (3)
49. (4)	**50.** (3)	**51.** (2)	**52.** (1)
53. (1)	**54.** (4)	**55.** (3)	**56.** (3)
57. (2)	**58.** (3)	**59.** (3)	**60.** (2)
61. (1)	**62.** (4)	**63.** (1)	**64.** (4)
65. (4)	**66.** (2)	**67.** (1)	**68.** (2)
69. (4)	**70.** (2)	**71.** (1)	**72.** (3)
73. (1)	**74.** (3)	**75.** (2)	**76.** (1)
77. (4)	**78.** (4)	**79.** (2)	**80.** (2)
81. (3)	**82.** (3)	**83.** (3)	**84.** (2)

85. (2)	**86.** (3)	**87.** (3)	**88.** (4)
89. (1)	**90.** (1)	**91.** (4)	**92.** (3)
93. (4)	**94.** (4)	**95.** (4)	**96.** (4)
97. (3)	**98.** (4)	**99.** (1)	**100.** (4)
101. (3)	**102.** (1)	**103.** (4)	**104.** (4)
105. (3)	**106.** (4)	**107.** (1)	**108.** (4)
109. (3)	**110.** (2)	**111.** (1)	**112.** (2)
113. (3)	**114.** (2)	**115.** (2)	**116.** (1)
117. (4)	**118.** (2)	**119.** (1)	**120.** (3)
121. (2)	**122.** (3)	**123.** (1)	**124.** (3)
125. (3)	**126.** (1)	**127.** (2)	**128.** (3)

TYPE-VI

1. (1)	**2.** (1)	**3.** (2)	**4.** (3)
5. (3)	**6.** (3)	**7.** (4)	**8.** (1)
9. (3)	**10.** (2)	**11.** (4)	**12.** (2)
13. (4)	**14.** (1	**15.** (1)	**16.** (4)
17. (4)	**18.** (1)	**19.** (4)	**20.** (1)
21. (1)	**22.** (4)	**23.** (4)	**24.** (4)
25. (1)	**26.** (4)	**27.** (4)	**28.** (4)
29. (2)	**30.** (4)	**31.** (4)	**32.** (2)
33. (3)	**34.** (3)	**35.** (4)	**36.** (1)
37. (4)			

TYPE-VII

1. (3)	**2.** (1)	**3.** (2)	**4.** (3)
5. (2)	**6.** (1)	**7.** (3)	**8.** (3)
9. (3)	**10.** (1)	**11.** (1)	**12.** (2)
13. (3)	**14.** (4)	**15.** (1)	**16.** (1)
17. (3)	**18.** (3)	**19.** (4)	**20.** (4)
21. (2)	**22.** (2)	**23.** (3)	**24.** (3)
25. (4)	**26.** (1)	**27.** (4)	**28.** (3)
29. (4)	**30.** (4)	**31.** (4)	**32.** (1)
33. (3)	**34.** (3)	**35.** (2)	**36.** (3)
37. (3)	**38.** (1)	**39.** (4)	**40.** (4)
41. (4)	**42.** (2)	**43.** (2)	**44.** (4)
45. (2)	**46.** (2)	**47.** (2)	**48.** (2)
49. (4)	**50.** (3)	**51.** (2)	**52.** (2)
53. (1)	**54.** (2)	**55.** (4)	**56.** (3)
57. (2)	**58.** (1)	**59.** (4)	**60.** (4)

EXPLANATIONS

TYPE-I

1. (2) Using Rule 10,
Side of square

$= \frac{\text{Diagonal}}{\sqrt{2}}$

$\therefore$ Area $= \frac{(\text{Diagonal})^2}{2}$

$= \frac{(5.2)^2}{2} = \frac{27.04}{2} = 13.52\ cm^2$

2. (3) Using Rule 10,

Side $= \frac{\text{Diagonal}}{\sqrt{2}} = \frac{a}{\sqrt{2}}$

$\therefore$ Area = (Side)^2

$= \left(\frac{a}{\sqrt{2}}\right)^2$ sq.cm. $= \frac{a^2}{2}$ sq.cm.

3. (4) Using Rule 10,
Side of the first square

$= \frac{1}{\sqrt{2}} \times 4\sqrt{2} = 4$ cm.

Its area = $(4)^2$ = 16 cm^2.
$\therefore$ Area of second square
= 2 × 16 = 32 cm^2.

Its side $= \sqrt{32} = 4\sqrt{2}$ cm.

$\therefore$ Required diagonal

$= \sqrt{2} \times 4\sqrt{2} = 8$ cm

4. (3) Using Rule 10,
Area of the square A

$= \frac{(\text{diagonal})^2}{2}$

$= \frac{(a+b)^2}{2}$

Area of the new square

$= \frac{(a+b)^2}{2} \times 2 = (a+b)^2$

$\Rightarrow$ Side = (a + b)

$\therefore$ Diagonal $= \sqrt{2} \times$ side

$= \sqrt{2}\ (a+b)$

5. (2) Let the length of the smaller line segment = x cm.
The length of larger line segment = $(x + 2)$ cm.
According to the question,
$(x + 2)^2 - x^2 = 32$
$\Rightarrow x^2 + 4x + 4 - x^2 = 32$
$\Rightarrow 4x = 32 - 4 = 28$

$\Rightarrow x = \frac{28}{4} = 7$

The required length
= x + 2 = 7 + 2 = 9 cm.

6. (3) Using Rule 10,
Let diagonals be $2x$ and $5x$.

$\therefore \frac{A_1}{A_2} = \frac{\frac{1}{2} \times (2x)^2}{\frac{1}{2} \times (5x)^2} = \frac{4}{25}$

$\Rightarrow$ 4 : 25

7. (3) Using Rule 10,
Side of the squares are 6 cm, 8 cm, 10 cm, 19 cm and 20 cm respectively.
Sum of their areas = $(6^2 + 8^2 + 10^2 + 19^2 + 20^2)$ cm^2
=(36+64+100 + 361 + 400)cm^2
= 961 cm^2
$\therefore$ Area of largest other square
= 961 cm^2

$\Rightarrow$ Its side = $\sqrt{961}$ = 31 cm

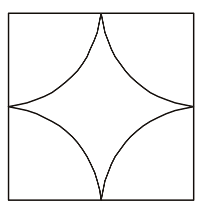
$\therefore$ Required perimeter
= 4 × 31 = 124 cm.

8. (2) Using Rule 10,
Let the side of square be a units.
Area of this square = a^2

The diagonal of square = $\sqrt{2}\ a$

$\therefore$ Area of square = $2a^2$
$\therefore$ Required ratio = $a^2 : 2a^2$
= 1 : 2

9. (2) Using Rule 10,



Area of sectors = $\pi r^2 = 4\pi$ sq.cm.
$\Rightarrow$ Area of square = 4 × 4 = 16 sq.cm.
$\therefore$ Area of the remaining portion
= $(16 - 4\pi)$ sq.cm.

10. (4) Diagonal of square

= $\sqrt{2}$ × side

$\therefore \sqrt{2}$ × side = $15\sqrt{2}$

$\Rightarrow$ Side $= \frac{15\sqrt{2}}{\sqrt{2}} = 15$

$\therefore$ Area of square = (side)^2
= 15 × 15 = 225 sq.cm.

Method 2 :

Quicker Approach

Area of square $= \frac{1}{2} \times (\text{diagonal})^2$

$= \frac{1}{2} \times 15\sqrt{2} \times 15\sqrt{2} = 225$ sq.cm.

11. (1) Using Rule 6 and 10,
Area of paper = Area of square + Area of equilateral triangle

$= \frac{1}{2}$ (diagonal)^2 + $\frac{\sqrt{3}}{4}$ × (side)^2

$= \frac{1}{2} \times 32 \times 32 + \frac{\sqrt{3}}{4} \times 8 \times 8$

= 512 + 16 × 1.732
= 512 + 27.712 = 539.712 cm^2

[**Note :** Diagonal of a square = $\sqrt{2}$ side]

12. (1) Using Rule 9,
Let the length of rectangular hall = x–metre

$\therefore$ Breadth $= \left(\frac{3}{4} \times x\right)$ metre

Area of rectangular
= Length × Breadth

$= x \times \frac{3}{4} x$ sq.m. $= \frac{3}{4} x^2$ m^2

$\therefore$ According to question,

$\frac{3}{4} x^2 = 768$

$\therefore x^2 = \frac{768 \times 4}{3}$

or, $x = \sqrt{\frac{768 \times 4}{3}}$ = 32m

$\therefore$ Length = 32 m and
Breadth = 24m
$\therefore$ Required difference
= 32 – 24 = 8 m

13. (1) Using Rule 9,
Let breadth of plot = x m
$\therefore$ length = $5x$ m.
According to question,

$\frac{5x^2}{2} = 245$

$\Rightarrow x^2 = \frac{245 \times 2}{5} = 98$

$\Rightarrow x = 7\sqrt{2}\ m$

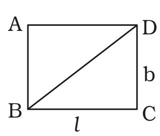
$\therefore$ Length

$= 5 \times 7\sqrt{2} = 35\sqrt{2}\ m$

14. (1) Using Rule 9 and 10,
Area of the rectangular garden = $12 \times 5 = 60$ m^2
= Area of the square garden
$\therefore$ Side of the square garden
$= \sqrt{60}\text{m}^2$
$\therefore$ Diagonal of the square garden
$= \sqrt{2} \times \text{side}$
$= \sqrt{2} \times \sqrt{60} = \sqrt{120} = \sqrt{4 \times 30}$
$= 2\sqrt{30}\text{m}$

15. (2) Using Rule 9 and 14,
Radius of circular wire
$= \dfrac{42}{2} = 21$ cm
Circumference of wire = $2\pi r$
$= 2 \times \dfrac{22}{7} \times 21 = 132$ cm
Let the length and breadth of rectangle be $6x$ and $5x$ cm respectively.
$\therefore$ Perimeter of rectangle
$= 2(6x + 5x) = 22x$
According to the question,
$22x = 132$
$\Rightarrow x = \dfrac{132}{22} = 6$
$\therefore$ Length of rectangle
$= 6x = 6 \times 6 = 36$ cm
Breadth of rectangle
$= 5x = 5 \times 6 = 30$ cm
$\therefore$ Area = 36×30
= 1080 cm^2

16. (4) Using Rule 9,



BD = length of diagonal
= speed × time
$= \dfrac{52}{60} \times 15 = 13$ metre
$\text{BD} = \sqrt{l^2 + b^2}$
$\Rightarrow l^2 + b^2 = 169$ ...(i)
Again,
$(l + b) = \dfrac{68}{60} \times 15 = 17$ ...(ii)
$\therefore (l + b)^2 = l^2 + b^2 + 2lb$
$\Rightarrow 17^2 = 169 + 2lb$
$\Rightarrow 2lb = 289 - 169 = 120$
$\Rightarrow lb = \dfrac{120}{2} = 60$ m^2

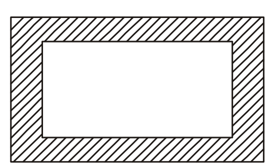
17. (4) Using Rule 9,
Let the breadth be x m.
$\therefore$ Length = $(23 + x)$ m
$\Rightarrow 2(x + 23 + x) = 206$
$\Rightarrow 4x = 206 - 46$
$\Rightarrow x = \dfrac{160}{4} = 40$m
$\therefore$ Length = $40 + 23 = 63$ m
$\therefore$ Required area = 63×40
= 2520 m^2

18. (3) Using Rule 14,
Area of the tank
$= 180 \times 120 = 21600$ m^2.
Total area of the circular plot
$= 40000 + 21600 = 61600$ m^2.
$\therefore \pi r^2 = 61600$
$\Rightarrow r^2 = \dfrac{61600 \times 7}{22}$
$= 2800 \times 7$
$\Rightarrow r = \sqrt{2800 \times 7}$
$\Rightarrow r = 2 \times 7 \times 10 = 140$m

19. (4) Using Rule 9,
Let the breadth of rectangular hall = x m.
$\therefore$ length = $(x + 5)$ m.
Area of hall
= Length × Breadth
$\Rightarrow 750 = (x + 5)x$
$\Rightarrow x^2 + 5x - 750 = 0$
$\Rightarrow x^2 + 30x - 25x - 750 = 0$
$\Rightarrow x(x + 30) - 25(x + 30) = 0$
$\Rightarrow (x - 25)(x + 30) = 0$
$\Rightarrow x = 25$, as x cannot be negative.
$\therefore$ Length of hall = $x + 5$
= 25 + 5 = 30 m.

20. (1) Using Rule 9,
Let the length and breadth of the rectangle be $3x$ and $2x$ cm respectively. Then,
$2(3x + 2x) = 20$
$\Rightarrow 10x = 20 \Rightarrow x = \dfrac{20}{10} = 2$
$\therefore$ Length = $3x = 3 \times 2$
= 6 cm
Breadth = $2x = 2 \times 2 = 4$ cm
$\therefore$ Area = $6 \times 4 = 24$ cm^2

21. (2)



Let the width of path be x m.
Area of rectangular field
$= 38 \times 32 = 1216$ m^2
Area of rectangular field without path = $(38 - 2x)(32 - 2x)$
$= 1216 - 64x - 76x + 4x^2$
$= 1216 - 140x + 4x^2$
$\therefore$ Area of the path
$= 1216 - 1216 + 140x - 4x^2$
$= 140x - 4x^2$
$\therefore 140x - 4x^2 = 600$
$\Rightarrow 4x^2 - 140x + 600 = 0$
$\Rightarrow x^2 - 35x + 150 = 0$
$\Rightarrow x^2 - 30x - 5x + 150 = 0$
$\Rightarrow x(x - 30) - 5(x - 30) = 0$
$\Rightarrow (x - 5)(x - 30) = 0$
$\Rightarrow x = 5$ as x ¹ 30
Aliter : Using Rule 3,
Here, L = 38 m, B = 32 m
w = ?,
Area of path = 600 m^2
Area of path = 2w [L + B – 2w]
600 = 2w [38 + 32 – 2w]
300 = w (70 – 2w)
2w^2 – 70w + 300 = 0
w^2 – 35w + 150 = 0
(w – 30) (w – 5) = 0
$\Rightarrow$ Either w – 30 = 0, w = 30
But w $\neq$ 30
or, w – 5 = 0, w = 5
$\therefore$ w = 5 is the width of path.

22. (2) Using Rule 10,
Net Effect on area of rectangle
$= \left(20 + 25 + \dfrac{20 \times 25}{100}\right)\% = 50\%$
$\left[\because \text{Net \% change} = \dfrac{a + b + ab}{100}\right]\%$

23. (3) Let the breadth of floor be x metre.
$\therefore$ Length = $(x + 20)$ metre
$\therefore$ Area of the floor
= $(x + 20)x$ sq. metre
According to question,
$(x + 10)(x + 5) = x(x + 20)$
$\Rightarrow x^2 + 15x + 50 = x^2 + 20x$
$\Rightarrow 20x = 15x + 50$
$\Rightarrow 5x = 50$
$\Rightarrow x = 10$ metre
$\therefore$ Length = $x + 20 = 10 + 20$
= 30 metre
$\therefore$ Area of the floor = 30×10
= 300 sq.metre

24. (1) Area of garden without street
$= 200 \times 180 = 36000$ sq.metre
Area of garden with street
$= 220 \times 200 = 44000$ sq.metre
$\therefore$ Area of the path
= 44000 – 36000
= 8000 sq.metre
Aliter : Using Rule 3,
Here, L = 200 m, B = 180 m
w = 10 m,
Area of path = 2w [L + B + 2w]
$= 2 \times 10 (200 + 180 + 2 \times 10)$
= 20 (400)
= 8000 m^2

25. (3) Using Rule 10,
Required percentage

$= \left(x + y + \frac{xy}{100}\right)\%$

Negative sign for decrease

$= \left(5 - 2 - \frac{5 \times 2}{100}\right)\% = 2.9\%$

26. (1) Using Rule 9,

$\frac{1}{12}$ hectare $= \frac{1}{12} \times 10000$ sq.metre

$= \frac{2500}{3}$ sq. metre

$\therefore 3x \times 4x = \frac{2500}{3}$

$\Rightarrow x^2 = \frac{2500}{3 \times 3 \times 4} \Rightarrow x = \frac{50}{6}$

$\Rightarrow$ Width $= 3x = 3 \times \frac{50}{6}$

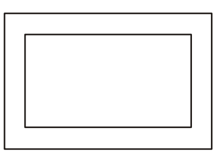
= 25 metre

27. (1) Using Rule 9 and 10,
Side of a square = x cm
$\therefore$ Area of rectangle = 3 × area of square

$\Rightarrow 20 \times \frac{3}{2} x = 3 \times x^2$

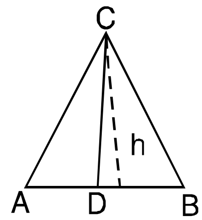
$\Rightarrow x = \frac{20 \times 3}{2 \times 3} = 10$ cm

28. (4)



Let length of rectangular field = $7x$ metre & breadth = $4x$ metre
Length of field with path
= $(7x + 8)$ metre
Breadth = $(4x + 8)$ metre
$\therefore$ Area of path
= $(7x + 8) \times (4x + 8) - 7x \times 4x$
= $28x^2 + 32x + 56x + 64 - 28x^2$
= $88x + 64$
$\therefore 88x + 64 = 416$
$\Rightarrow 88x = 416 - 64 = 352$
$\Rightarrow x = 4$
$\therefore$ Breadth of field = 16 metre
Aliter : Using Rule 3,
Here, L = $7x$, B = $4x$
w = 4 m,
Area of path = 2w [L + B + 2w]
416 = 2 × 4 $(7x + 4x + 2 \times 4)$
416 = 8 $(11x + 8)$
52 = $11x + 8$
$11x = 44$
$x = 4$
$\therefore$ Breadth of field = 4 × 4 = 16 m

29. (4) Using Rule 1,



Given : AB = 5
DB = 3
$\therefore$ AD = 5 – 3 = 2
In the figure we can see that both ΔADC and ΔABC have the same height, h.
Area of a triangle

$= \frac{1}{2} \times$ base × height

When height is constant,
We know, Area of triangle α base,

$\therefore \frac{\text{Area of } \Delta ADC}{\text{Area of } \Delta ABC} = \frac{AD}{AB} = \frac{2}{5}$

30. (4) Using Rule 1,
Let the base and altitude be 3x and 4x respectively.
$\therefore$ According to question,

$\frac{1}{2}$ base × altitude = 1176 cm^2

or, $\frac{1}{2} \times 3x \times 4x = 1176$

$12x^2 = 1176 \times 2$

$x^2 = \frac{1176 \times 2}{12}$

$x^2 = 196$

$\Rightarrow x = \sqrt{196} = 14$ cm.

$\therefore$ Altitude of a triangle = 4x
= 4 × 14 cm = 56 cm

31. (2) Using Rule 1,
Area of the first triangle

$= \frac{1}{2} \times$ base × height

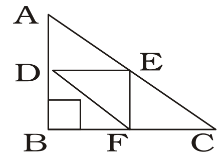
$= \frac{1}{2} \times 15 \times 12 = 90$ cm^2

According to the question
Area of the another (second) triangle = 2 × 90 = 180 cm^2
$\therefore$ Area of the new triangle =

180 cm^2 $= \frac{1}{2} \times 20 \times$ height

$\therefore$ Height $= \frac{180 \times 2}{20} = 18$ cm

32. (3) Using Rule 1,



$3^2 + 4^2 = 5^2$
Δ ABC is a right angled triangle.

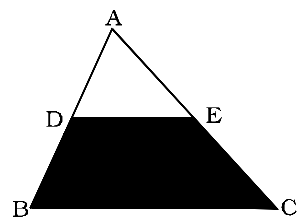
$\therefore$ area ABC $= \frac{1}{2} \times$ AB × BC

$= \frac{1}{2} \times 3 \times 4 = 6cm^2$

$\therefore$ Required Area of Δ DEF

$= \frac{1}{4} \times 6 = \frac{3}{2}$ sq.cm.

33. (3)



D is the mid-point of AB and E is the mid-point of AC.
$\therefore$ DE is parallel to BC.

and DE $= \frac{1}{2}$ BC

ΔADE and ΔABC are similar, because

$\angle D = \angle B$ and $\angle E = \angle C$

$\therefore \frac{\Delta ADE}{\Delta ABC} = \frac{DE^2}{BC^2} = \frac{1}{4}$

$\Rightarrow 4\Delta ADE = \Delta ABC$
$\therefore$ Area of trapezium DBCE
= ΔABC – ΔADE
4ΔADE – ΔADE = 3.ΔADE
$\therefore$ Required percentage

$= \frac{3}{4} \times 100 = 75\%$

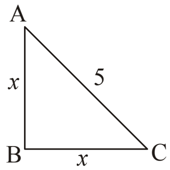
34. (3) Using Rule 1,
Let the respective altitudes be p_1 and p_2.

$\therefore \frac{a}{b} = \frac{\frac{1}{2} \times x \times p_1}{\frac{1}{2} \times y \times p_2}$

$\Rightarrow \frac{p_1}{p_2} = \frac{ay}{bx}$

$\Rightarrow ay : bx$

35. (2) Using Rule 1,



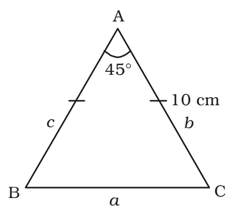
$x^2 + x^2 = (5)^2 \Rightarrow 2x^2 = 25$

$\Rightarrow x^2 = \frac{25}{2} \Rightarrow x = \frac{5}{\sqrt{2}}$

Area = $\frac{1}{2} \times \frac{5}{\sqrt{2}} \times \frac{5}{\sqrt{2}}$

$= \frac{25}{4} = 6.25$ sq.cm

36. (3)



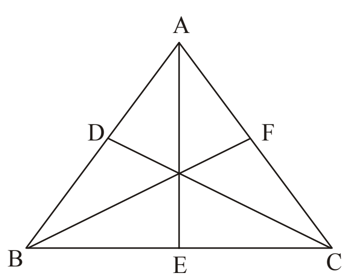
AB = AC = 10 cm

$\therefore$ Area = $\frac{1}{2}$ bc sin A

$= \frac{1}{2} \times 10 \times 10 \sin 45°$

$= \frac{50}{\sqrt{2}} = \frac{50 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = 25\sqrt{2}$ cm^2

37. (3) Using Rule 1 and 6,
Let the side of the equilateral triangle ABC be x cm.



According to the question,

$\frac{1}{2} \times x \times 6 + \frac{1}{2} \times x \times 8 + \frac{1}{2} \times x \times 10 = \frac{\sqrt{3}}{4} \times x^2$

$\Rightarrow 3x + 4x + 5x = \frac{\sqrt{3}}{4} x^2$

$\Rightarrow \frac{\sqrt{3}}{4} x = 12$

$\Rightarrow x = \frac{12 \times 4}{\sqrt{3}} = 16\sqrt{3}$ cm

$\therefore$ Area of Δ ABC

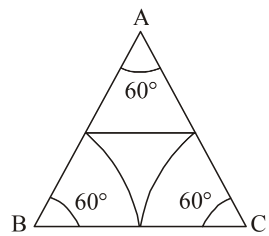
$= \frac{\sqrt{3}}{4} \times \left(16\sqrt{3}\right)^2 = 192\sqrt{3}$ cm^2

38. (3) The ratio of the area of two similar triangles is equal to the ratio of square of the corresponding altitudes.

Ratio of altitudes = $\frac{\sqrt{25}}{\sqrt{36}} = \frac{5}{6}$

or 5 : 6

39. (3) Using Rule 17,



Each angle of the triangle = 60°
Required area of the three sectors = $3 \times \frac{60}{360} \times \pi(1)^2$

$= \frac{\pi}{2}$ cm^2

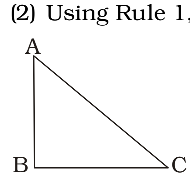
Area of triangle

$= \frac{\sqrt{3}}{4} \times 4 = \sqrt{3}\ cm^2$

$\therefore$ Required area

$= \left(\sqrt{3} - \frac{\pi}{2}\right) cm^2$

40. (2) Using Rule 1,



Let AB = BC = x;

AC = $16\sqrt{2}$

$\therefore\ x^2 + x^2 = \left(16\sqrt{2}\right)^2$

$\Rightarrow 2x^2 = 16 \times 16 \times 2$

$\Rightarrow x^2 = 16 \times 16$

$\Rightarrow x = 16$

$\therefore$ Area of triangle

$= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 16 \times 16 = 128$ cm^2

41. (4) Using Rule 2 and 3,
Ratio = 2 : 3 : 4
= 4 : 6 : 8
Perimeter = 18 cm

$\therefore$ Semi-perimeters = $\frac{4+6+8}{2}$

= 9

$\therefore$ Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{9(9-4)(9-6)(9-8)}$

$= \sqrt{9 \times 5 \times 3 \times 1} = 3\sqrt{15}$ sq.cm.

42. (3) Using Rule 6,
If the side of the equilateral triangle be x units,
then,

$3x = \sqrt{3}\left(\frac{\sqrt{3}}{4} x^2\right)$

$\Rightarrow 3x = \frac{3x^2}{4}$

$\Rightarrow x = 4$ units

43. (1) Using Rule 6,
Area of the equilateral triangle =

$\frac{\sqrt{3}}{4} \times (\text{side})^2$

$= \frac{\sqrt{3}}{4} \times 6 \times 6 = 9\sqrt{3}$ sq.cm.

44. (3) Using Rule 1 and 14,
Let the corresponding altitude of the triangle = x cm.
According to the question,
Area of the triangle = Area of the circle

$\Rightarrow \frac{1}{2} x \times 8 = \pi \times 8 \times 8$

$\Rightarrow x = 2 \times 8\pi = 16\pi$ cm.

45. (4) Using Rule 1,
$3^2 + 4^2 = 5^2$
$\therefore$ Base = 3 cm and
perpendicular = 4 cm
$\therefore$ Area of the right angled triangle

$= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 3 \times 4 = 6$ sq.cm.

46. (4) Using Rule 6,
Area of the equilateral triangle =

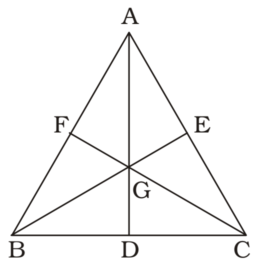
$\frac{\sqrt{3}}{4} \times \text{Side}^2$

$\therefore\ 4\sqrt{3} = \frac{\sqrt{3}}{4}(\text{Side})^2$

$\Rightarrow (\text{Side})^2 = \frac{4\sqrt{3}\times 4}{\sqrt{3}} = 16$

$\therefore$ Side $= \sqrt{16}$ = 4 cm

47. (2) Using Rule 1,
AG = 6 cm.



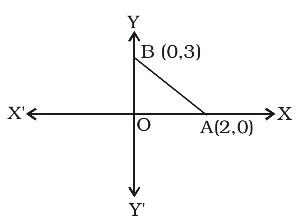
BG $= \frac{2}{3}\times 12$ = 8 cm.

GC $= \frac{2}{3}\times 15$ = 10 cm.

Area of ΔABG $= \frac{1}{2}\times 6\times 8$

= 24 sq. cm.
$\therefore$ Area of ΔABC
= 3 × 24 = 72 sq. cm.

48. (1) Putting $y = 0$ in the equation $3x + 2y = 6$,
$3x + 0 = 6 \Rightarrow x = 2$



$\therefore$ Point of intersection on x-axis = (2, 0)
Putting $x = 0$, in the equation $3x + 2y = 6$,
gives $0 + 2y = 6$
$\Rightarrow y = 3$
$\therefore$ Point of intersection on y-axis = (0, 3)
So, OA = 2, OB = 3

$\therefore\ \Delta OAB = \frac{1}{2}\times OA\times OB$

$= \frac{1}{2}\times 2\times 3 = 3$ sq. units

49. (4) Using Rule 1 and 3,
Let Sides = $3x$, $3x$ and $4x$
Semi perimeter

$= \frac{3x+3x+4x}{2} = 5x$

$\therefore\ \Delta = \sqrt{5x(5x-3x)(5x-3x)(5x-4x)}$

$= \sqrt{5x\times 2x\times 2x\times x}$

$= 2\sqrt{5}x^2$

$\therefore\ 2\sqrt{5}x^2 = 18\sqrt{5}$
$\Rightarrow x^2 = 9 \Rightarrow x = 3$
$\therefore$ Third side = $4x = 4\times 3$
= 12 units

50. (3) Using Rule 1,
Here, $(3x)^2 + (4x)^2 = (5x)^2$
$\therefore$ It is a right angled triangle.
So, Area of the triangle

$= \frac{1}{2}\times 3x\times 4x = 6x^2$

$\therefore\ 6x^2 = 72 \Rightarrow x^2 = 12$

$\Rightarrow x = 2\sqrt{3}$
Hence, Smallest side

$= 3x = 6\sqrt{3}$ units

51. (1) Using Rule 6,
Side of equilateral triangle
= x units.

$\therefore\ \frac{\sqrt{3}}{4}\left((x+2)^2 - x^2\right) = 3 + \sqrt{3}$

$\Rightarrow \frac{\sqrt{3}}{4}(4x+4) = 3+\sqrt{3}$

$\Rightarrow \sqrt{3}x + \sqrt{3} = 3 + \sqrt{3} = \sqrt{3}x = 3$

$\Rightarrow x = \sqrt{3}$ units

52. (3) Using Rule 2 and 3,
Semi-perimeter,

$S = \frac{9+10+11}{2}$ = 15 cm

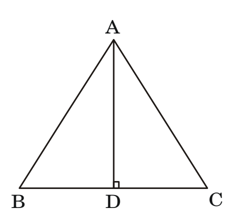
Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{15(15-9)(15-10)(15-11)}$

$= \sqrt{15\times 6\times 5\times 4} = 30\sqrt{2}$ cm²

53. (3) Using Rule 1,



Let, AB = AC = x units
BD = DC = 1 unit [$\because$ BC = 2 units]

Now, AD $= \sqrt{AB^2 - BD^2}$

$= \sqrt{x^2 - 1}$

$\therefore\ \frac{1}{2}\times BC\times AD = 4$

$\Rightarrow \frac{1}{2}\times 2\times\sqrt{x^2-1} = 4$

$\Rightarrow \sqrt{x^2-1} = 4$
$\Rightarrow x^2 - 1 = 16$
$\Rightarrow x^2 = 17$

$\Rightarrow x = \sqrt{17}$ units

54. (2) Using Rule 1 and 6,
Sides of triangle
Let $3x$, $4x$ and $5x$ units
Here, $(3x)^2 + (4x)^2 = (5x)^2$
$\therefore$ It is a right angled triangle.
Now, Area of triangle

$= \frac{1}{2}\times 3x\times 4x = 6x^2$

$\therefore\ 6x^2 = 72$

$\Rightarrow x^2 = \frac{72}{6}$

$\Rightarrow x = \sqrt{12} = 2\sqrt{3}$
Perimeter of right angled triangle
$= 3x + 4x + 5x$
$= 12x = 12\times 2\sqrt{3}$

$= 24\sqrt{3}$ units
$\therefore$ Perimeter of equilateral triangle $= 24\sqrt{3}$ units

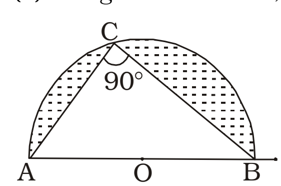
Its side $= \frac{24\sqrt{3}}{3} = 8\sqrt{3}$ units

Area $= \frac{\sqrt{3}}{4}\times(\text{side})^2$

$= \frac{\sqrt{3}}{4}\times 8\sqrt{3}\times 8\sqrt{3}$

$= 48\sqrt{3}$ sq units.

55. (2) Using Rule 1 and 14,



$\angle ACB = 90°$
AC = CB = x cm
AB = 14 cm
From Δ ABC
AC² + BC² = AB²
$\Rightarrow x^2 + x^2 = 14^2$
$\Rightarrow 2x^2 = 14\times 14$
$\Rightarrow x^2 = 14\times 7$

$\Rightarrow x = \sqrt{14 \times 7} = 7\sqrt{2}$ cm

$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times AC \times BC$

$= \frac{1}{2} \times 7\sqrt{2} \times 7\sqrt{2} = 49$ sq. cm

Area of semi-circle

$= \frac{\pi r^2}{2} = \frac{22}{7 \times 2} \times 7 \times 7$

= 77 sq. cm

$\therefore$ Area of the shaded region

= 77 – 49 = 28 sq. cm = 28 cm^2

56. (1) Using Rule 2 and 3,
Let the sides of triangle be a, b and c respectively.

$\therefore 2s = a + b + c = 32$

$\Rightarrow 11 + b + c = 32$

$\Rightarrow b + c = 32 - 11 = 21$ .....(i)

and $b - c = 5$ ......(ii)

By adding equations (i) and (ii)

$2b = 26 \Rightarrow b = 13$

$\Rightarrow c = 13 - 5 = 8$

Now, $2s = 32 \Rightarrow s = 16$

$a = 11$, $b = 13$, $c = 8$

$\therefore$ Area of triangle

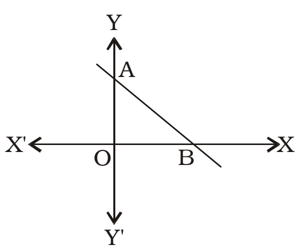
$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{16(16-11)(16-13)(16-8)}$

$= \sqrt{16 \times 5 \times 3 \times 8}$

$= 8\sqrt{30}$ sq. cm.

57. (3)



Putting $y = 0$ in the equation $3x + 4y = 12$,

$3x + 0 = 12 \Rightarrow x = 4$

Co-ordinates of point B = (4, 0)

Putting $x = 0$ in the equation $3x + 4y = 12$

$0 + 4y = 12 \Rightarrow y = 3$

$\therefore$ Co-ordinates of point A = (0, 3)

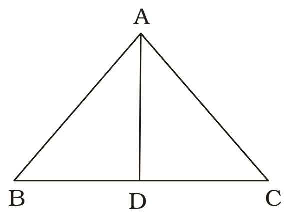
$\Rightarrow$ OB = 4 and OA = 3

$\therefore$ Area of Δ OAB

$= \frac{1}{2} \times OB \times OA$

$= \frac{1}{2} \times 4 \times 3 = 6$ sq. units

58. (3) Using Rule 6,



Let AB = BC = CA = $2a$ cm,
$AD \perp BC$

$AD = \sqrt{AB^2 - BD^2}$

$= \sqrt{4a^2 - a^2} = \sqrt{3}\,a$

$\therefore \sqrt{3}\,a = 15$

$\Rightarrow a = 5\sqrt{3}$

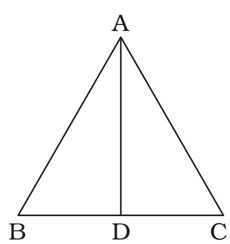
$\therefore 2a =$ Side $= 10\sqrt{3}$ cm

$\therefore$ Area of triangle

$= \frac{\sqrt{3}}{4} \times \left(10\sqrt{3}\right)^2$

$= 75\sqrt{3}$ sq. cm.

59. (2) Using Rule 6,



$\frac{\sqrt{3}}{4} \times \text{side}^2 = 9\sqrt{3}$

$\Rightarrow \text{Side}^2 = 9 \times 4 = 36$

$\Rightarrow$ Side $= \sqrt{36} = 6$ metre

$\therefore$ BD = 3 metre

$AD = \sqrt{AB^2 - BD^2} = \sqrt{6^2 - 3^2}$

$= \sqrt{36 - 9} = \sqrt{27} = 3\sqrt{3}$ metre

60. (3) Using Rule 2 and 3,
Semi–perimeter

$S = \frac{16 + 12 + 20}{2}$

$= \frac{48}{2} = 24$ cm

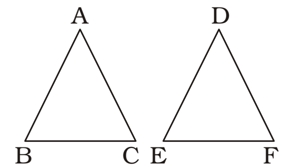
Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{24(24-16)(24-12)(24-20)}$

$= \sqrt{24 \times 8 \times 12 \times 4} = 96$ sq.cm.

61. (3)



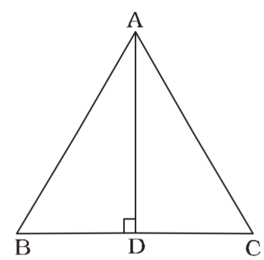
$\frac{ar(\Delta ABC)}{ar(\Delta DEF)} = \frac{AB^2}{DE^2}$

$\Rightarrow \frac{360}{250} = \frac{8 \times 8}{DE^2}$

$\Rightarrow DE^2 = \frac{8 \times 8 \times 250}{360} = \frac{8^2 \times 5^2}{6^2}$

$\Rightarrow DE = \frac{8 \times 5}{6} = \frac{20}{3} = 6\frac{2}{3}$ cm

62. (4)



Let AD be the altitude.
Base = x cm

Each equal side $= \frac{5x}{6}$ cm

$\therefore x + 2 \times \frac{5x}{6} = 544$

$\Rightarrow \frac{3x + 5x}{3} = 544$

$\Rightarrow 8x = 544 \times 3$

$\Rightarrow x = \frac{544 \times 3}{8} = 204$

$\therefore$ BD = 102 cm

$\Rightarrow AB = \frac{5x}{6} = \frac{5 \times 204}{6} = 170$ cm

and $AD = \sqrt{AB^2 - BD^2}$

$= \sqrt{170^2 - 102^2}$

$= \sqrt{(170 + 102)(170 - 102)}$

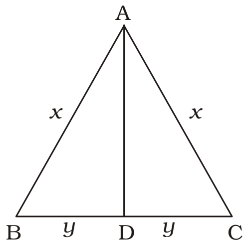
$= \sqrt{272 \times 68} = 136$ cm

$\therefore \Delta ABC = \frac{1}{2} BC \times AD$

$= \frac{1}{2} \times 204 \times 136$

= 13872 sq.cm.

63. (4)



Let AB = AC = x cm
and BD = DC = y cm
then, $AD^2 = x^2 - y^2$
$\Rightarrow x^2 - y^2 = 64$
$x + x + 2y = 64$
$\Rightarrow 2x + 2y = 64$
$\Rightarrow x + y = 32$

$\therefore \dfrac{x^2 - y^2}{x + y} = \dfrac{64}{32}$

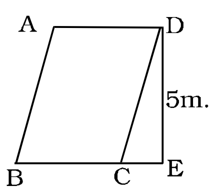
$\Rightarrow x - y = 2$
$\therefore x + y = 32$
$x - y = 2$

$2x = 34$
$\Rightarrow x = 17$ cm
Also, $x + y = 32$
$\Rightarrow y = 32 - 17 = 15$ cm

$\therefore$ area of $\Delta ABC = \dfrac{1}{2} \times BC \times AD$

$= \dfrac{1}{2} \times 30 \times 8 = 120$ sq.cm.

64. (2) Using Rule 12,



Perimeter of rhombus
= 4 × side
$\therefore$ 4 × side = 40

$\Rightarrow$ Side $= \dfrac{40}{4} = 10$ m.

As, rhombus is a parallelogram of equal sides, its area = base × height = 10 × 5 = $50m^2$.

65. (1) Using Rule 13,
Let the parallel sides be $5x$ and $3x$ metres.

Area of trapezium $= \dfrac{1}{2}$ (sum of parallel sides) × distance between them

$\Rightarrow 1440 = \dfrac{1}{2}(5x + 3x) \times 24$

$\Rightarrow 12 \times 8x = 1440$

$\Rightarrow x = \dfrac{1440}{12 \times 8} = 15$

$\therefore$ The longer parallel side
$= 5x = 5 \times 15 = 75$ metres

66. (2) Using Rule 12,
Let d_1, d_2 be the diagonals of a rhombus, Area $= \dfrac{1}{2} d_1 . d_2$

$\Rightarrow 150 = \dfrac{1}{2} \times 10 \times d_2$

$\Rightarrow d_2 = \dfrac{150}{5} = 30$cm.

67. (3) Using Rule 12,
Perimeter of rhombus

$= 2\sqrt{d_1^2 + d_2^2}$

Where d_1 and d_2 are diagonals.

$\therefore 2\sqrt{d_1^2 + d_2^2} = 100$

$\Rightarrow \sqrt{d_1^2 + d_2^2} = 50$

$\Rightarrow d_1^2 + d_2^2 = 2500$

$\Rightarrow (14)^2 + d_2^2 = 2500$

$\Rightarrow d_2^2 = 2500 - 196 = 2304$

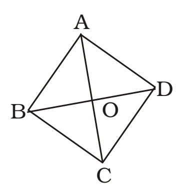
$\therefore d_2 = \sqrt{2304} = 48$

$\therefore$ Area of the rhombus

$= \dfrac{1}{2} d_1 \times d_2$

$= \dfrac{1}{2} \times 14 \times 48 = 336$ sq.cm.

68. (3) Using Rule 12,



AB = 10cm, AC = 16 cm;
$\Rightarrow$ AO = 8 cm

$\therefore BO = \sqrt{10^2 - 8^2}$

$= \sqrt{100 - 64}$

$= \sqrt{36} = 6$ cm

$\therefore$ BD = 12cm
Hence, Area of rhombus

$= \dfrac{1}{2} d_1 d_2$

$= \dfrac{1}{2} \times 16 \times 12 = 96$ cm^2

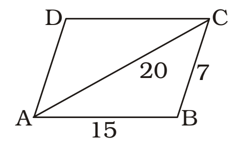
69. (4) Using Rule 13,

Area of the trapezium $= \dfrac{1}{2}$ (sum of parallel sides) × altitude

$\Rightarrow 450 = \dfrac{1}{2}(3x + 2x) \times 15$

$\Rightarrow 5x = \dfrac{450 \times 2}{15} = 60$ cm

70. (3) Using Rule 2 and 3,



Area of parallelogram ABCD
= Area of 2 ΔABC
Semi-perimeter of ΔABC

$S = \dfrac{20 + 7 + 15}{2} = \dfrac{42}{2} = 21$ cm

$\therefore$ area of Δ ABC

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{21(21-7)(21-20)(21-15)}$

$= \sqrt{21 \times 14 \times 6} = 42$ sq.cm.

$\therefore$ Area of parallelogram = 2 × 42
= 84 sq. cm.

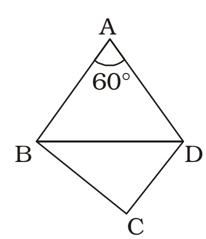
71. (2) Using Rule 11,
Let the sides of parallelogram be $5x$ and $4x$.
Base × Height
= Area of parallelogram
$\therefore 5x \times 20 = 1000$

$\Rightarrow x = \dfrac{1000}{5 \times 20} = 10$

$\Rightarrow$ Sides = 50 and 40 units
$\therefore 40 \times h = 1000$

$\Rightarrow h = \dfrac{1000}{40} = 25$ units

72. (2) Using Rule 12,



Side $= \dfrac{40}{4} = 10$ cm

AB = AD = 10 cm
$\angle ABD = \angle ADB = 60°$
$\therefore$ Area of the rhombus

$= 2 \times \frac{\sqrt{3}}{4} \times (AB)^2$

$= 2 \times \frac{\sqrt{3}}{4} \times 10 \times 10$

$= 50\sqrt{3}$ cm^2

73. (4) Using Rule 13,
Let Sides of the trapezium be $2x$ and $3x$ cm

$\therefore \frac{1}{2}(2x + 3x) \times 12 = 480$

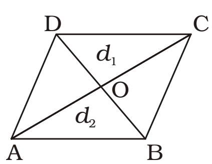
$\Rightarrow 5x = \frac{480}{6} = 80$

$\Rightarrow x = \frac{80}{5} = 16$

$\therefore$ Larger side $= 3x = 16 \times 3$
$= 48$ cm

74. (4) $l + b + h = 24$ [given]
$l^2 + b^2 + h^2 = 225$ [given]
$\therefore (l + b + h)^2$
$= l^2 + b^2 + h^2 + 2(lb + bh + hl)$
$\Rightarrow (24)^2 = 225 + 2(lb + bh + hl)$
$\Rightarrow 2(lb + bh + hl)$
$= 576 - 225 = 351$ sq. cm.

75. (4) Using Rule 12,



Side of rhombus $= \frac{20}{4} = 5$ cm

OB = 4 cm

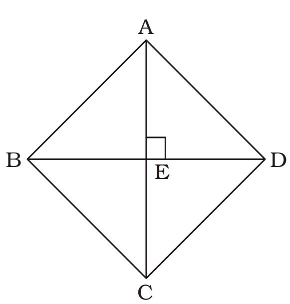
OA $= \sqrt{5^2 - 4^2} = \sqrt{9} = 3$ cm

AC = 6 cm

Area of rhombus

$= \frac{1}{2}d_1 d_2 = \frac{1}{2} \times 8 \times 6 = 24$ sq. cm

76. (3) Using Rule 12,



BD = 40 cm
BE = 20 cm
AE = x cm

AB $= \frac{100}{4} = 25$ cm

$\therefore$ From ΔABE,

AE $= \sqrt{25^2 - 20^2}$

$= \sqrt{45 \times 5} = 15$ cm

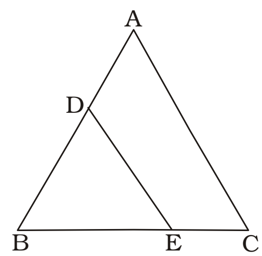
$\therefore$ AC = 30 cm

Area of rhombus ABCD

$= \frac{1}{2}d_1 d_2 = \frac{1}{2} \times 40 \times 30$

= 600 sq.cm

77. (4)



DE | | AC $\therefore \Delta DBE \cong \Delta ABC$

$\frac{AD}{DB} = \frac{EC}{EB} = \frac{3}{2}$

$\frac{AD}{DB} + 1 = \frac{3}{2} + 1$

$\Rightarrow \frac{AB}{DB} = \frac{5}{2}$

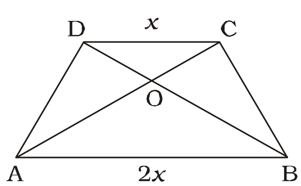
$\therefore \frac{\Delta ABC}{\Delta DBE} = \frac{AB^2}{BD^2} = \frac{25}{4}$

$\Rightarrow \frac{\Delta ABC}{\Delta DBE} - 1 = \frac{25}{4} - 1$

$\Rightarrow \frac{\Delta ABC - \Delta DBE}{\Delta DBE} = \frac{25 - 4}{4}$

$\Rightarrow \frac{\square ACED}{\Delta DBE} = \frac{21}{4}$ or 21 : 4

78. (1)



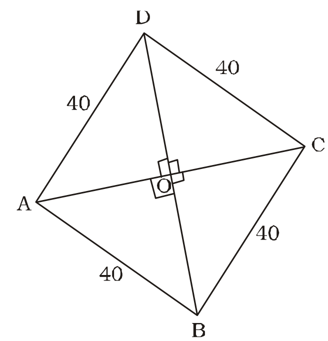
Let CD = x
$\Rightarrow$ AB = $2x$. Δ COD ~ Δ AOB because CD | | AB and take BD and AC as transversals.

$\therefore \frac{ar(COD)}{ar(AOB)} = \frac{CD^2}{AB^2} = \frac{x^2}{4x^2} = \frac{1}{4}$.

$\Rightarrow \Delta$ ABD – Δ AOD
$= \Delta$ ACB – Δ BOC
$\Rightarrow \Delta$ AOB = Δ AOB

$\Rightarrow \frac{\Delta AOB}{\Delta COD} = \frac{1}{1}$ or 1 : 1

79. (4) Using Rule 12,



Side of rhombus = side of square.

$= \sqrt{2a} = 40\sqrt{2} \Rightarrow a = 40$

AC $\perp$ BD; $\angle$AOD = 90°

Let AC = $3x$ and BD = $4x$ cm

$\therefore$ AO $= \frac{3x}{2}$; OD = $2x$ cm

From ΔAOD,
$OA^2 + OD^2 = AD^2$

$\Rightarrow \left(\frac{3x}{2}\right)^2 + 4x^2 = 40^2$

$\Rightarrow 9x^2 + 16x^2 = 1600 \times 4$
$\Rightarrow 25x^2 = 6400$
$\Rightarrow x^2 = 6400 \div 25 = 256$
$\Rightarrow x = \sqrt{256} = 16$
$\therefore$ AC = 3 × 16 = 48 cm
and BD = 4 × 16 = 64 cm
$\therefore$ Area of rhombus

$= \frac{1}{2} \times AC \times BD$

$= \frac{1}{2} \times 48 \times 64$

= 1536 sq. cm.

80. (1) Area of regular hexagon

$= \frac{3\sqrt{3}}{2} \times (\text{side})^2$

$= \frac{3\sqrt{3}}{2} \times 2\sqrt{3} \times 2\sqrt{3}$

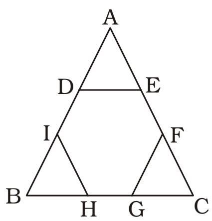
$= 18\sqrt{3}$ cm^2.

81. (1) Area of a regular hexagon

$= \frac{3\sqrt{3}}{2} \times (\text{Side})^2$

$= \frac{3\sqrt{3}}{2} \times 1 = \frac{3\sqrt{3}}{2} \text{cm}^2$

82. (3) $\boxed{\text{Tricky approach}}$



Side of the regular hexagon

$= \frac{1}{3} \times 6 = 2 \text{ cm}$

$\therefore$ Area of the hexagon

$= \frac{3\sqrt{3}}{2} a^2$

$= \frac{3\sqrt{3}}{2} \times 2 \times 2$

$= 6\sqrt{3}$ sq. cm.

83. (3) Perimeter of regular hexagon = Perimeter of equilateral triangle.

i.e. If a side of the regular hexagon be x units, then side of triangle = $2x$ units.

$\therefore$ Required ratio

$= 6 \frac{\sqrt{3}}{4} x^2 : \frac{\sqrt{3}}{4} (2x)^2$

= 6 : 4 = 3 : 2

84. (2) Using Rule 17,

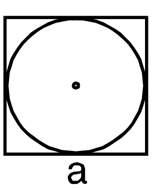
Here, l = arc length= 3.5 cm

r = radius = 5 cm

$\therefore$ Area of sector $= \frac{1}{2} \, l \, r$

$= \frac{1}{2} \times 3.5 \times 5 = 8.75 \text{ cm}^2$

85. (4)



The diameter of the largest circle inscribed inside a square is equal to its side.

$\therefore$ d = a = 28cm.

Area of the circle $= \frac{\pi d^2}{4}$

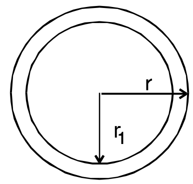
$= \frac{1}{4} \times \frac{22}{7} \times (28)^2 \text{cm}^2$

$= 22 \times 28 \text{ cm}^2 = 616 \text{ cm}^2$

86. (3) When the circumference is doubled, it means radius of circle is doubled, as circumference $= 2\pi r$

Since, area $= \pi r^2$, it will quadrupled.

87. (2)



According to question,

Circumference of outer circle

$= 2\pi r = 132$ cm

$\Rightarrow r = \frac{132}{2 \times 22} \times 7 = 21 \text{ cm}$

Circumference of inner circle

$= 2\pi r_1 = 88$cm

$\Rightarrow r_1 = \frac{88}{2 \times 22} \times 7 = 14 cm$

$\therefore$ Area of outer circle $= \pi r^2$

$= \frac{22}{7} \times 21 \times 21 = 1386 \text{ cm}^2$

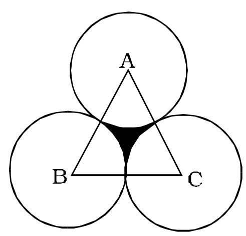
and Area of inner circle $= \pi r_1^2$

$= \frac{22}{7} \times 21 \times 21 = 1386 \text{ cm}^2$

$\therefore$ Area of ring

$= (1386 - 616) \text{ cm}^2 = 770 \text{cm}^2$

88. (2) Using Rule 6 and 17,



Radius of each circle = 3.5 cm

From the figure.

ΔABC will be an equilateral triangle of side 7 cm each.

Now, the required area

= Area of DABC – 3× (Area of a sector of angle 60° in a circle of radius 3.5 cm)

$= \frac{\sqrt{3}}{4} \times (7)^2 - 3\left[\frac{60}{360} \times \frac{22}{7} \times (3.5)^2\right] \text{cm}^2$

$= \left[\frac{49\sqrt{3}}{4} - 19.25\right] \text{cm}^2$

$= [21.217 - 19.25] \text{ cm}^2$

$= 1.967 \text{ cm}^2$

89. (1) Using Rule 14,

$\because \pi r^2 = 2464$ sq.m.

$\Rightarrow r^2 = \frac{2464 \times 7}{22} = 784$

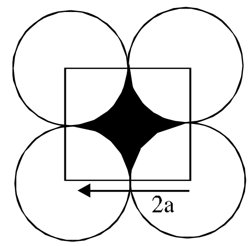
$\Rightarrow$ r = 28 m.

$\therefore$ Required distance = 2r

= 2 × 28 = 56 metres

90. (2) Using Rule 10 and 14,

Area of shaded part

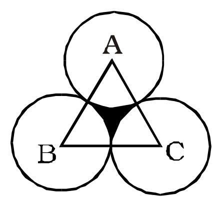


= Area of square – Area of circle

$= (2a)^2 - \pi r^2 = 4a^2 - \frac{22}{7} a^2$

$\Rightarrow \frac{28a^2 - 22a^2}{7} = \frac{6a^2}{7}$

91. (2) Using Rule 6 AND 17,



Obviously, the triangle ABC will be equilateral.

AB = BC = CA = 2 cm.

Area of ΔABC

$= \frac{\sqrt{3}}{4} \times 2 \times 2$

$= \sqrt{3} \text{ cm}^2$.

Then, area 'A' of the three sectors each of angle 60° in a circle of radius 1 cm.

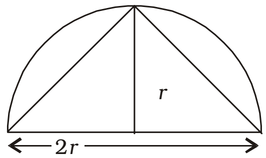
$A = 3 \times \frac{60}{360} \times \pi \times 1 = \frac{\pi}{2}$

$\therefore$ Area of the shaded portion

$= \left(\sqrt{3} - \frac{\pi}{2}\right) \text{cm}^2$.

92. (2) Using Rule 1,

The largest triangle inscribed in a semi-circle will have base equal to $2r$ cm and height equal to r cm as shown in figure.



$\therefore$ Area = $\frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 2r \times r = r^2$ cm^2

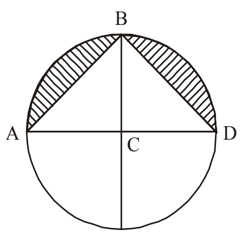
93. (1) Using Rule 14,
Area of original circle
$= \pi \times (6)^2 = 36\,\pi$ cm^2
After trisection, the area of the smallest circle

$= \frac{1}{3} \times 36\pi = 12\pi$

$= \pi \times \left(2\sqrt{3}\right)^2$

$\therefore$ Required radius = $2\sqrt{3}$ cm

94. (3) Using Rule 1 and 14,



Let Radius of circle = a units
$\therefore$ Area of semi circle

$= \frac{\pi a^2}{2}$ sq.units

Both triangles Δ ABC and Δ BCD are isosceles and equal.

$\therefore$ Area of each triangle $= \frac{1}{2}a^2$

$\Rightarrow$ Area of both triangles

$= 2 \times \frac{1}{2}a^2 = a^2$ sq.units

$\therefore$ Area of shaded region

$= \frac{\pi a^2}{2} - a^2 = a^2\left(\frac{\pi}{2} - 1\right)$ sq.units

95. (3) Using Rule 14,
Let the original radius be r cm.
According to the question,
$\pi(r+1)^2 - \pi r^2 = 22$
$\Rightarrow \pi\,(r^2+2r+1-r^2) = 22$

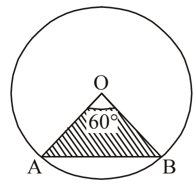
$\Rightarrow (2r+1) \times \frac{22}{7} = 22$

$\Rightarrow 2r+1 = \frac{22 \times 7}{22} = 7$

$\Rightarrow 2r = 7-1 = 6 \Rightarrow r = \frac{6}{2} = 3$ cm.

96. (1) Using Rule 14,
Required ratio
$= \pi\,(4r)^2 : \pi\,(2r)^2 : \pi\,(r)^2$
$= 16 : 4 : 1$

97. (1) Using Rule 17,
Let the radius of the circle be r cm.



According to the question,

$2\pi r = 11 \Rightarrow 2 \times \frac{22}{7} r = 11$

$\Rightarrow r = \frac{11 \times 7}{2 \times 22} = \frac{7}{4}$ cm

$\therefore$ Area of the sector AOB

$= \frac{\theta}{360°} \times \pi r^2$

$= \frac{60°}{360°} \times \frac{22}{7} \times \frac{7}{4} \times \frac{7}{4}$ sq.cm

$= \frac{77}{48} = 1\frac{29}{48}$ sq.cm.

98. (1) Using Rule 14,
If the radius of the circular park be r metre, then $2\,\pi r = 176$

$\Rightarrow 2 \times \frac{22}{7} \times r = 176$

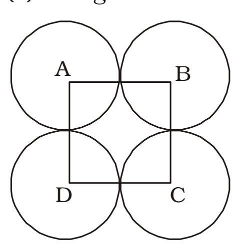
$\Rightarrow r = \frac{176 \times 7}{2 \times 22} = 28$ metre

Radius of the park with road
= 28 + 7 = 35 metre
$\therefore$ Area of the road

$= \frac{22}{7}\ (35^2 - 28^2)$

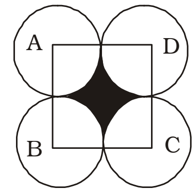
$= \frac{22}{7} \times 63 \times 7 = 1386$ m^2

99. (4) Using Rule 10 and 14,



Side of the square = 8 cm
$\therefore$ Area of the square
= 8 × 8 = 64 sq.cm.
Area of the four sectors
$= \pi \times 4^2 = 16\pi$ sq.cm.
$\therefore$ Required area $= 64 - 16\pi$
$= 16\,(4 - \pi)$ sq.cm.

100. (2) Using Rule 10 and 17,



Area of the shaded region
= Area of square of side
6cm – 4 × a right angled sector

$= 36 - 4 \times \frac{\pi \times 3^2}{4}$

$= 36 - 9\pi = 9(4 - \pi)$ sq. cm.

101. (1) Using Rule 14,
$\pi(r + 1)^2 - \pi r^2 = 22$

$\Rightarrow \pi(r^2 + 2r + 1 - r^2) = 22$
$\Rightarrow 2\pi r + \pi = 22$

$\Rightarrow \frac{22}{7}(2r + 1) = 22$

$\Rightarrow 2r + 1 = 7$
$\Rightarrow 2r = 6 \Rightarrow r = 3$ cm.

102. (1) Using Rule 14,
$\pi r^2 = \pi \times 5^2 + \pi \times 12^2$
$\Rightarrow r^2 = 25 + 144 = 169$

$\Rightarrow r = \sqrt{169} = 13$ cm

103. (4) Using Rule 14,
$\pi r + 2r = 36$

$\Rightarrow r\left(\frac{22}{7} + 2\right) = 36$

$\Rightarrow r\left(\frac{22+14}{7}\right) = 36$

$\Rightarrow r = \frac{36 \times 7}{36} = 7$ metre

Area $= \frac{\pi r^2}{2}$

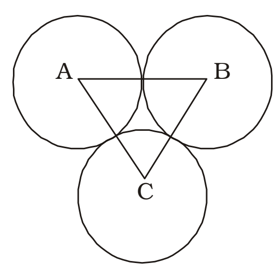
$= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$
= 77 sq. metre

104. (1) Using Rule 14,

$\pi r_1^2 : \pi r_2^2 = 4 : 7$

$\Rightarrow r_1 : r_2 = \sqrt{4} : \sqrt{7} = 2 : \sqrt{7}$

105. (1) Using Rule 1,



x = AB = $a + b$
y = BC = $b + c$
z = CA = $a + c$

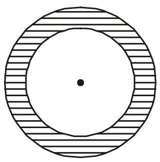
$\therefore\ s = \dfrac{AB + BC + CA}{2} = a + b + c$

$\therefore$ Area of Δ ABC

$= \sqrt{s(s-x)(s-y)(s-z)}$

$= \sqrt{(a+b+c)abc}$

106. (3) Using Rule 14,



Area of circle $= kr^2$
Area of shaded region
$= k(5^2 - 3^2) = 16\pi$ sq. units
Area of larger circle $= k \times 5^2$
$= 25\pi$ sq. units
$\therefore$ Required ratio = 16 : 25

107. (1) Using Rule 10 and 14,
Let Side of square = x units
Diagonal of square = $\sqrt{2}x$ units

then Radius of smaller circle = $\dfrac{x}{2}$ units

Radius of larger circle

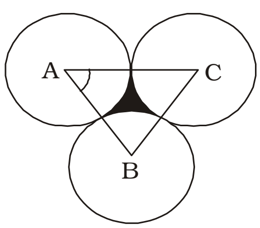
$= \dfrac{\sqrt{2}x}{2} = \dfrac{x}{\sqrt{2}}$ units

$\therefore$ Required ratio of areas

$= \pi\dfrac{x^2}{4} : \dfrac{\pi x^2}{2}$

= 2 : 4 = 1 : 2

108. (4) Using Rule 6 and 17,



Let AB = BC = CA = $2a$ cm.
$\angle BAC = \angle ACB = \angle ABC = 60°$

Area of ΔABC $= \dfrac{\sqrt{3}}{4} \times (\text{side})^2$

$= \dfrac{\sqrt{3}}{4} \times 4a^2$

$= \sqrt{3}a^2$ sq.cm.

Area of three sectors

$= 3 \times \dfrac{60}{360} \times \pi \times a^2$

$= \dfrac{\pi a^2}{2}$ sq.cm.

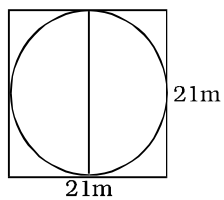
Area of the shaded region

$= \sqrt{3}a^2 - \dfrac{\pi}{2}a^2$

$= \left(\dfrac{2\sqrt{3} - \pi}{2}\right)a^2$ sq.cm.

109. (4) Using Rule 14,
Let the required radius = r cm, then
$\pi r^2 = \pi r_1^2 + \pi r_2^2$
$\Rightarrow r^2 = r_1^2 + r_2^2 = 10^2 + 24^2$
= 100 + 576 = 676
$\therefore\ r = \sqrt{676} = 26$ cm

110. (3) Using Rule 14,



The diameter of the greatest circle inscribed inside a square will be equal to the side of square i.e., 21 cm.

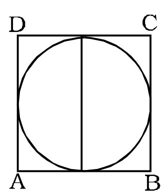
$\therefore$ Radius of the circle $= \dfrac{21}{2}$

$\therefore$ Area of the circle
$= \pi \times (\text{radius})^2$

$= \dfrac{22}{7} \times \dfrac{21}{2} \times \dfrac{21}{2} = \dfrac{693}{2}$ cm^2.

= 346.5 cm^2.

111. (1) Using Rule 14,



Side of the square

$= \dfrac{120}{4} = 30$ cm.

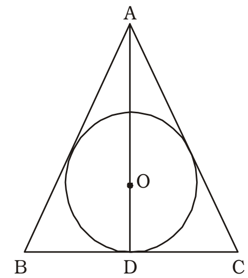
Clearly, diameter of the greatest circle = Side of the square = 30 cm

$\therefore$ Radius $= \dfrac{30}{2} = 15$ cm

Required area = $\pi \times (\text{radius})^2$

$= \dfrac{22}{7} \times (15)^2$ cm^2.

112. (2)



Let ABC be the equilateral triangle of side 42 cm and let AD be perpendicular from A on BC. Since the triangle is equilateral, so D bisects BC.
$\therefore$ BD = CD = 21 cm.
The centre of the inscribed circle will coincide with the centroid of Δ ABC.

Therefore, $OD = \dfrac{1}{3}AD$

In Δ ABC
$AB^2 = AD^2 + BD^2$
$\Rightarrow 42^2 = AD^2 + 21^2$

$\Rightarrow AD = \sqrt{42^2 - 21^2}$

$= \sqrt{(42+21)(42-21)}$

$= \sqrt{63 \times 21} = 3 \times 7\sqrt{3}$ cm,

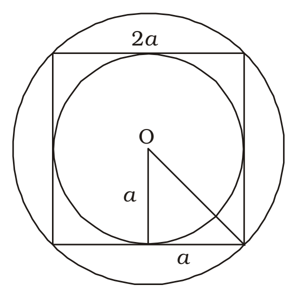
$\therefore\ OD = \dfrac{1}{3}AD = 7\sqrt{3}$ cm.

$\therefore$ Area of the incircle $= \pi\ (OD)^2$

$= \dfrac{22}{7} \times 7\sqrt{3} \times 7\sqrt{3}$

$= 22 \times 7 \times 3 = 462$ cm^2

113. (1) Using Rule 14,



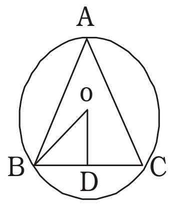
Let the side of the square be $2x$.
Then radius of incircle = a
Radius of circum-circle

$\sqrt{a^2 + a^2} = \sqrt{2}a$

$\therefore$ Ratio of area

$= \pi a^2 : \pi\left(\sqrt{2}a\right)^2 = a^2 : 2a^2 = 1 : 2$

114. (1) Using Rule 6,



Area of ΔABC = $\frac{\sqrt{3}}{4}\times(\text{side})^2$

$\Rightarrow \frac{\sqrt{3}}{4}\times(\text{side})^2 = 4\sqrt{3}$

$\Rightarrow$ side = $\sqrt{16}$ = 4 cm

$\therefore \angle BOD = 60°$

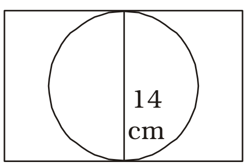
$\therefore \sin 60° = \frac{BD}{OB}$

$\Rightarrow \frac{\sqrt{3}}{2} = \frac{2}{OB} \Rightarrow OB = \frac{4}{\sqrt{3}}$

$\therefore$ Area of circle = πr^2

$= \pi\times\frac{16}{3} = \frac{16}{3}\pi\,\text{cm}^2$

115. (2) Using Rule 14,

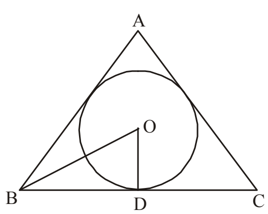


The largest circle will have radius equal to 7 cm.

$\therefore$ Area = $\pi \times r^2$

$= \frac{22}{7}\times 7\times 7$ = 154 cm^2

116. (2) Using Rule 6 and 14,



Radius of in-circle = BD cot 60°

$= \frac{4}{\sqrt{3}}$ cm

Area of the circle

$= \pi\times\frac{4}{\sqrt{3}}\times\frac{4}{\sqrt{3}}$

$= \frac{16}{3}\pi$ cm^2 = 16.76 cm^2

Area of the triangle

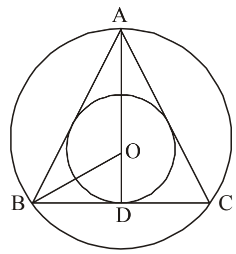
$= \frac{\sqrt{3}}{4}\times 8\times 8$

$= 16\sqrt{3}$ cm^2

$\therefore$ Required area = $16\sqrt{3}$ – 16.76

= (27.71 – 16.76) = 10.95 cm^2

117. (3) Let the each side of the equilateral triangle be $2x$ cm.



Then BD = x

Radius of incircle = OD = $\frac{1}{3}$ AD

$= \frac{1}{3}\sqrt{(2x)^2 - x^2}$

$= \frac{\sqrt{3}x}{3} = \frac{x}{\sqrt{3}}$ cm

Radius of circum circle

$= \text{BO} = \sqrt{\text{BD}^2 + \text{OD}^2}$

$= \sqrt{x^2 + \frac{x^2}{3}} = \frac{2x}{\sqrt{3}}$ cm

According to the question,

$\pi\left(\frac{2x}{\sqrt{3}}\right)^2 - \pi\left(\frac{x}{\sqrt{3}}\right)^2 = 44$

$\Rightarrow \frac{4\pi x^2}{3} - \frac{\pi x^2}{3} = 44$

$\Rightarrow \pi x^2 = 44$

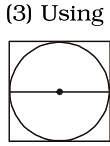
$\Rightarrow x^2 = \frac{44\times 7}{22} = 14$

$\therefore$ Area of the equilateral triangle

$= \frac{\sqrt{3}}{4}\times\text{side}^2 = \frac{\sqrt{3}}{4}\times(2x)^2$

$= \sqrt{3}x^2 = 14\sqrt{3}$ Sq. cm.

118. (3) Using Rule 10 and 14,



$\therefore$ Area of the circle = $\pi r^2 = 9\pi$

$\Rightarrow r^2 = 9$

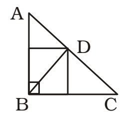
$\Rightarrow r = \sqrt{9}$ = 3 cm

$\therefore$ Side of the square = $2r$ = 6 cm

$\therefore$ Area of the Square = side^2

= 6 × 6 = 36 cm^2

119. (4) Using Rule 1,



Here, $6^2+8^2 = 10^2$

Hence, ΔABC is right angled

BD is perpendicular to AC

$\therefore \frac{1}{2}\times AB\times BC = \frac{1}{2}\times AC\times BD$

$\Rightarrow \frac{1}{2}\times 6\times 8 = \frac{1}{2}\times 10\times BD$

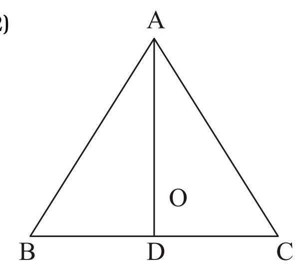
$\Rightarrow BD = \frac{48}{10} = \frac{24}{5}$

$\therefore$ BD = diagonal of square

$\therefore$ Area of square = $\frac{24\times 24}{2\times 5\times 5}$

$= \frac{576}{50}$ cm^2

120. (2)



Let AD $\perp$ BC

$\therefore$ BD = 4 cm and

AB = 8 cm

$\therefore AD = \sqrt{AB^2 - BD^2} = \sqrt{8^2 - 4^2}$

$= \sqrt{64-16} = \sqrt{48} = 4\sqrt{3}$ cm

$\therefore$ OD = radius of the in circle

$= \frac{1}{3}\times 4\sqrt{3}$ cm $= \frac{4}{\sqrt{3}}$ cm

$\therefore$ Area of the in circle

$= \pi\left(\frac{4}{\sqrt{3}}\right)^2$ cm^2 = $\frac{16}{3}\pi$ cm^2

AO = radius of circum-circle

$= \frac{2}{3}\times 4\sqrt{3} = \frac{8}{\sqrt{3}}$ cm

$\therefore$ Area of the cirum-circle

$= \pi\times\left(\frac{83}{\sqrt{3}}\right)^2 = \frac{64}{3}\pi$ cm^2

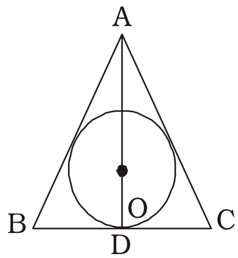
$\therefore$ Area of the required region

$= \left(\frac{64}{3}\pi - \frac{16}{3}\pi\right)$ cm²

$= \frac{48\pi}{3} = 16\pi$ cm²

$= \frac{16 \times 22}{7} = \frac{352}{7} = 50\frac{2}{7}$ cm²

121. (3)



BD = DC = $7\sqrt{3}$ cm

AD = $\sqrt{AB^2 - BD^2}$

$= \sqrt{(14\sqrt{3})^2 - (7\sqrt{3})^2}$

$= \sqrt{(14\sqrt{3} + 7\sqrt{3})(14\sqrt{3} - 7\sqrt{3})}$

$= \sqrt{21\sqrt{3} \times 7\sqrt{3}} = 21$cm

$\therefore$ OD = Radius of circle

$= \frac{1}{3} \times 21 = 7$cm

$\therefore$ Area of circle = πr^2

$= \frac{22}{7} \times 7 \times 7 = 154$ sq.cm.

122. (2) Using Rule 10 and 14,

Side of square $= \sqrt{2}$ metre

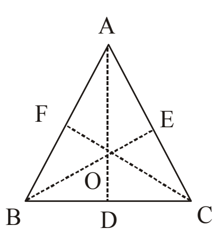
Radius of in-circle

$= \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$ metre

Area of the circle $= \pi r^2$

$= \pi \times \frac{1}{2} = \frac{\pi}{2}$ sq. metre.

123. (1) Using Rule 1 and 6,



Let the side of the equilateral triangle be x cm.

$\therefore$ Δ AOB + ΔBOC + Δ COA = Δ ABC

$\Rightarrow \frac{1}{2}x \times 3 + \frac{1}{2} \times x \times 4 + \frac{1}{2} \times x \times 5$

$= \frac{\sqrt{3}}{4}x^2$

$\Rightarrow 6 = \frac{\sqrt{3}}{4}x \Rightarrow x = \frac{24}{\sqrt{3}} = 8\sqrt{3}$

$\therefore$ Area of Δ ABC = $\frac{\sqrt{3}}{4} \times$ side²

$= \frac{\sqrt{3}}{4} \times 8\sqrt{3} \times 8\sqrt{3} = 48\sqrt{3}$ sq.cm.

124. (2) For the equilateral triangle of side a,

In radius = $\frac{a}{2\sqrt{3}}$

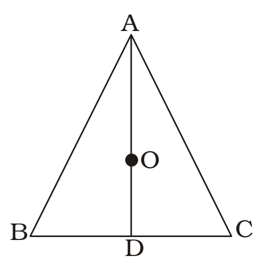
Circum-radius = $\frac{a}{\sqrt{3}}$

$\therefore$ Required ratio

$= \pi\left(\frac{a}{\sqrt{3}}\right)^2 : \pi\left(\frac{a}{2\sqrt{3}}\right)^2$

$= \frac{1}{3} : \frac{1}{12} = 4:1$

125. (4)



DB= DC = 3cm.

AD = $\sqrt{AB^2 - BD^2} = \sqrt{6^2 - 3^2}$

$= \sqrt{36 - 9} = \sqrt{27} = 3\sqrt{3}$ cm.

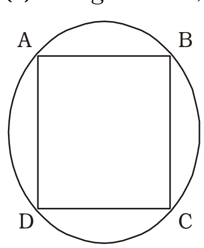
$\therefore$ OD = In-radius

$= \frac{1}{3} \times 3\sqrt{3} = \sqrt{3}$ cm.

$\therefore$ Area of the in-circle = πr^2

$= \pi \times \sqrt{3} \times \sqrt{3} = 3\pi$ sq.cm.

126. (3) Using Rule 10,



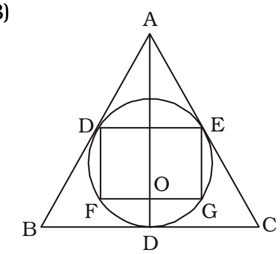
BD = Diagonal = 16 cm

[$\because$ Radius = 8 cm]

Area of square = $\frac{1}{2} \times BD^2$

$= \frac{1}{2} \times 16 \times 16 = 128$ sq. cm.

127. (3)



Let AB = BC = CA = x units, then

AD = $\sqrt{x^2 - \frac{x^2}{4}} = \frac{\sqrt{3}x}{2}$

OD = $\frac{1}{3}$ AD = $\frac{x}{2\sqrt{3}}$ = radius of circle

$\Rightarrow$ Diagonal of square

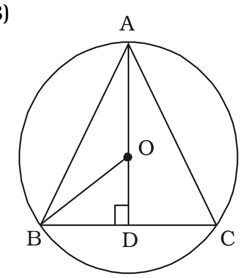
$= 2 \times \frac{x}{2\sqrt{3}} = \frac{x}{\sqrt{3}}$

$\therefore$ Triangle : Square

$= \frac{\sqrt{3}}{4}x^2 : \frac{x^2}{2 \times 3}$

$= \frac{\sqrt{3}}{2} : \frac{1}{3} = 3\sqrt{3} : 2$

128. (3)



Let AB = BC = AC = $2x$ units

AD = $\sqrt{4x^2 - x^2} = \sqrt{3}x$

OD = $\frac{1}{3} \times \sqrt{3}x = \frac{x}{\sqrt{3}}$

$\therefore$ OB = $\sqrt{x^2 + \frac{x^2}{3}}$

$= \frac{2x}{\sqrt{3}}$ = Circum radius

$\therefore$ ΔABC : Area of circum-circle

$= \frac{\sqrt{3}}{4} \times 4x^2 : \pi \times \frac{4x^2}{3}$

$= 3\sqrt{3} : 4\pi$

129. (2) Using Rule 10,
Area of a square = $(\text{side})^2$

$= \left(\frac{\text{Perimeter}}{4}\right)^2 = \left(\frac{44}{4}\right)^2$

$=(11)^2 = 121 \text{ cm}^2$

Area of a cricle = $\pi (\text{radius})^2$

$= \pi \left(\frac{\text{Circumference}}{2\pi}\right)^2$

$= \frac{(\text{Circumference})^2}{4\pi}$

$= \frac{44 \times 44}{4 \times \frac{22}{7}} = 22 \times 7 = 154 \text{ cm}^2$

Area of circle – Area of square
$= 154 - 121 = 33\text{cm}^2$
$\therefore$ Area of the circle is larger than the area of the square by 33 cm^2.

130. (2) Using Rule 14,
Area of circular field = πr^2
= 3850 sq.m.
$\Rightarrow \pi r^2 = 3850$

$\Rightarrow r^2 = \frac{3850}{22} \times 7$

$\Rightarrow r^2 = 1225$

$\therefore r = \sqrt{1225} = 35 \text{ m}$

Now, circumference of circle = $2\pi r$

$= 2 \times \frac{22}{7} \times 35 = 44 \times 5 = 220 \text{ m}$

$\therefore$ According to question,
Perimeter of Square = Circumference of circle
Let side of square be x m.
then, 4x = 220m
$\Rightarrow$ x = 55m
$\therefore$ Area of square = x^2
$= 55 \times 55\text{m}^2 = 3025 \text{ m}^2$

131. (4) Using Rule 10,
Let the length of the side of the square be x cm.
$\therefore x^2 = (x + 5)(x - 3)$
$\Rightarrow x^2 = x^2 + 5x - 3x - 15$

$\Rightarrow 2x = 15 \Rightarrow x = \frac{15}{2}$ cm.

Now, length of the rectangle

$= x + 5 = \frac{15}{2} + 5 = \frac{25}{2}$ cm

and breadth

$= \frac{15}{2} - 3 = \frac{15-6}{2} = \frac{9}{2}$ cm

$\therefore$ Required perimeter

$= 2\left(\frac{25}{2} + \frac{9}{2}\right) = 2 \times \frac{34}{2} = 34$ cm

132. (2) Using Rule 10,
The length of wire
= perimeter of the square

$= 4 \times \sqrt{\text{Area of square}}$

$= 4 \times \sqrt{81} = 4 \times 9 = 36$ cm

Now, perimeter of semicircular shape = 36 cm
$\Rightarrow (\pi \times r + 2r) = 36$ cm.

$\Rightarrow r\left(\frac{22}{7} + 2\right) = 36$ cm

$\Rightarrow r \times \frac{36}{7} = 36$ cm

$\Rightarrow r = \frac{36 \times 7}{36} = 7$ cm

$\therefore$ Required area

$= \frac{\pi r^2}{2} = \frac{22 \times 7 \times 7}{7 \times 2}$

$= 77 \text{ cm}^2$.

133. (1) Let the length and breadth of rectangle are a and b respectively.
According to the question,
$2(a + b) = 160$
$\Rightarrow a + b = 80$ ...(i)
$a - b = 48$ ...(ii)

$2a = 128$ (On adding)

$\Rightarrow a = \frac{128}{2} = 64m$

From equation (i),
$b = 80 - 64 = 16\ m$
$\therefore$ Area of rectangle
$= 64 \times 16\ m^2$
$\therefore$ Area of square
$= 64 \times 16\ m^2$
$\Rightarrow (\text{side})^2 = 64 \times 16$
$\Rightarrow$ side $= 8 \times 4 = 32\ m$

134. (2) Using Rule 1 and 10,
Area of square = $(12)^2$
$= 144 \text{ cm}^2$
Area of triangle

$= \frac{1}{2} \times$ base $\times$height

$= \frac{1}{2} \times 12 \times$ height

$\Rightarrow \frac{1}{2} \times 12 \times \text{height} = 144$

$\Rightarrow \text{Height} = \frac{144 \times 2}{12} = 24\text{cm}$

135. (2) Using Rule 9 and 10,
Let the length of rectangle
= 48 m. and
breadth = 16m.
Perimeter of square
= Perimeter of rectangle
= 2(48 + 16)
$\Rightarrow 4 \times \text{Side} = 2 \times 64$

$\Rightarrow \text{Side} = \frac{2+64}{4} = 32$ metres

$\therefore$ Area of the square = $(32)^2$
$= 1024 \text{ metre}^2$

136. (4) Using Rule 6 and 10,
As a square and an equilateral triangle are drawn on the same base, side of triangle and square will be the same. Let the side be x units.

$\therefore \frac{\text{Area of square}}{\text{Area of triangle}} = \frac{x^2}{\frac{\sqrt{3}}{4}x^2}$

$= \frac{4}{\sqrt{3}} \Rightarrow 4 : \sqrt{3}$

137. (3) Using Rule 10 and 14,
Side of the square

$= \sqrt{121} = 11$ cm
$\therefore$ Length of the wire = 4 × side
= 4 × 11 = 44 cm
Now the wire is bent into the form of a circle.
If the radius of the circle be r cm, then,
$\therefore 2\pi r = 44$

$\Rightarrow r = \frac{44}{2\pi} = \frac{44 \times 7}{2 \times 22} = 7$ cm

$\therefore$ Area of the circle = πr^2

$= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$

138. (3) Using Rule 6 and 14,
Area of the equilateral triangle

$= \frac{\sqrt{3}}{4} \text{side}^2$

$\Rightarrow 121\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$

$\therefore \text{Side}^2 = \frac{121\sqrt{3} \times 4}{\sqrt{3}} = 121 \times 4$

$\therefore \text{Side} = \sqrt{121 \times 4}$
$= 11 \times 2 = 22$ cm
$\therefore$ Total length of wire= 3 × 22
= 66 cm
Let the radius of the circle be r cm, then
$2\pi r = 66$

$\Rightarrow \dfrac{2 \times 22}{7} \times r = 66$

$\Rightarrow r = \dfrac{66 \times 7}{2 \times 22} = \dfrac{21}{2}$ cm

$\therefore$ Area of the circle $= \pi r^2$

$= \dfrac{22}{7} \times \dfrac{21}{2} \times \dfrac{21}{2}$

$= 346.5$ cm^2

139. (4) Using Rule 10 and 14,
Side of a square

$= \sqrt{81} = 9$ cm

$\therefore$ Length of the wire
$= 4 \times 9 = 36$ cm.
$\therefore$ Perimeter of semi-circle
$= (\pi + 2)r$ where r = radius

$\Rightarrow \left(\dfrac{22}{7} + 2\right) r = 36$

$\Rightarrow \dfrac{36}{7} r = 36$

$\Rightarrow r = \dfrac{36 \times 7}{36} = 7$ cm.

140. (2) Using Rule 17,
Area grazed by all cows

$= \dfrac{180°}{360°} \pi r^2 = \dfrac{\pi r^2}{2}$

$= \dfrac{1}{2} \times \dfrac{22}{7} \times 7 \times 7 = 77$ sq.metre

Semi-perimeter of triangular field

$S = \dfrac{26 + 28 + 30}{2} = 42$ metres

$\therefore$ Area of the field

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{42(42-26)(42-28)(42-30)}$

$= \sqrt{42 \times 16 \times 14 \times 12}$

= 336 sq.metre
$\therefore$ Area ungrazed by the cows
= 336 – 77
= 259 sq.metre

141. (3) Using Rule 6 and 10,
Let the side of the square be x units, then

diagonal $= \sqrt{2}x$ units

$\therefore$ Area of the square $= x^2$
and area of triangle

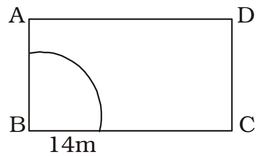
$= \dfrac{\sqrt{3}}{4} (\sqrt{2}x)^2$

$= \dfrac{\sqrt{3}x^2}{2}$ sq. units

$\therefore$ Required ratio

$= x^2 : \dfrac{\sqrt{3}x^2}{2} = 2 : \sqrt{3}$

142. (3) Using Rule 17,



Required area $= \dfrac{\pi}{4} r^2$

$= \dfrac{22 \times 14 \times 14}{7 \times 4} = 154\text{m}^2$

143. (2) Using Rule 10 and 14,
Let the radius of circle be r units and the side of square be x units, then
$x^2 = \pi r^2$

$\Rightarrow \dfrac{x^2}{r^2} = \dfrac{\pi}{1} \Rightarrow \dfrac{x}{r} = \dfrac{\sqrt{\pi}}{1}$ or $\sqrt{\pi} : 1$

144. (4) Using Rule 9 and 10,
Let Side of rectangle are $2x$ and x units.
and Side of square = y units
$\therefore 4y = 6x$

$\Rightarrow \dfrac{x}{y} = \dfrac{4}{6} = \dfrac{2}{3}$

$\therefore \dfrac{2x \times x}{y^2} = \dfrac{2x^2}{y^2} = \dfrac{2 \times 4}{9}$

= 8 : 9

145. (3) Using Rule 1 and 9,
Let Length of rectangle = x units and breadth = y units
$\therefore$ Side of triangle = y units
$\Rightarrow 2x + 2y = 3y$
$\Rightarrow 2x = y$ ...(i)

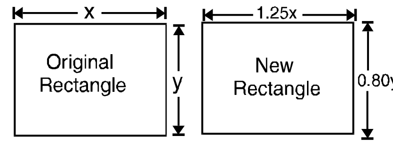
$\therefore \dfrac{\text{Area of rectangle}}{\text{Area of triangle}}$

$= \dfrac{xy}{\dfrac{\sqrt{3}}{4} y^2} = \dfrac{4x}{\sqrt{3}y}$

$= \dfrac{4x}{\sqrt{3}.2x} = \dfrac{2}{\sqrt{3}}$ or $2 : \sqrt{3}$

146. (2) Using Rule 10 and 14,
Radius of circle = Side of square = r units
$\therefore$ Area of circle : Area of square
$= \pi r^2 : r^2$
$= \pi : 1$

147. (3) Using Rule 10,



According to question,
Area of original rectangle
= xy
Area of new rectangle
= 1.25x × 0.80y
= xy
$\therefore$ Effective change

$= \left(25 - 20 - \dfrac{25 \times 20}{100}\right)\% = 0\%$

i.e. Hence, the area of the rectangle remains unchanged.

148. (2) Using Rule 10,
Let the length and breadth of a rectangle are changed by x and y per cent respectively, then the net change

$= \left(x + y + \dfrac{xy}{100}\right)\%$, where positive and negative signs show increase and decrease respectively.

$\therefore$ Net change

$= -10 + 10 - \dfrac{10 \times 10}{100} = -1\%$

149. (3) Using Rule 10,
Net effect

$= \left(20 + 20 + \dfrac{20 \times 20}{100}\right)\%$

= 40 + 4 = 44%

150. (4) Let radius = r
$\therefore$ Circumference = $2\pi r$
Reduced circumference

$= \pi r = 2\pi \times \dfrac{r}{2}$

$\therefore$ New radius $= \dfrac{r}{2}$

$\therefore$ Reduced area

$= \pi \times \left(\dfrac{r}{2}\right)^2 = \dfrac{\pi r^2}{4}$

It is 25% of πr^2 (the original area)
$\therefore$ Area is reduced by 75%.

151. (4) Using Rule 12,
Let the side of a square is increased by x %, its area is increased by $\left(2x + \dfrac{x^2}{100}\right)\%$.

Here, x = 25%

∴ Effective increase in area

$= \left(2 \times 25 + \frac{25 \times 25}{100}\right)\% = 56.25\%$

152. (1) Using Rule 12,
If the radius of circle is increased by x%, the area changes by

$\left(2x + \frac{x^2}{100}\right)\%$

$= \left(2 \times 50 + \frac{50 \times 50}{100}\right)\% = 125\%$

153. (2) Using Rule 10,
Effective change in area

$= \left(x + y + \frac{xy}{100}\right)\%$

where x and y denote percentage change

$= \left(20 - 20 - \frac{20 \times 20}{100}\right)\%$

= – 4 %
Hence, the area will decrease by 4%

154. (2) Using Rule 10,
Effective increase

$= \left(50 + 50 + \frac{50 \times 50}{100}\right)\% = 125\ \%$

155. (3) Let the base of triangle be decreased by x%.
According to the question,

$10 - x - \frac{10x}{100} = 0$

[∵ Area remains same]

$\Rightarrow x + \frac{x}{10} = 10$

$\Rightarrow \frac{10x + x}{10} = 10 \Rightarrow \frac{11x}{10} = 10$

$\Rightarrow x = \frac{100}{11} = 9\frac{1}{11}\%$

156. (4) Using Rule 10,
For an increase of 50% in the circumference of circle, the radius of circle should be increased by 50%.
Then, required percentage increase in the area of the circle

$= 50 + 50 + \frac{50 \times 50}{100}$

= 100 + 25 = 125 %

157. (2) Using Rule 10,
Percentage increase in the area of rectangle

$= \left(12 + 15 + \frac{12 \times 15}{100}\right)\%$

$= \left(27 + \frac{9}{5}\right)\% = 28\frac{4}{5}\%$

158. (2) Using Rule 10,
Let the length and breadth of a rectangle are changed by x% and y% respectively, the effective change in area

$= \left(x + y + \frac{xy}{100}\right)\%$

Here, $x = -40$
$y = -40$
∴ Percentage decrease

$= \left(-40 - 40 + \frac{40 \times 40}{100}\right)\%$

= (– 80 + 16) % = – 64%
Negative sign shows decrease.

159. (1) Using Rule 10,
For changes of x% and y% in length and breadth respectively, effective change in area

$= (x + y + \frac{xy}{100})\%$

(decrease with negative sign)

$\therefore 60 - y - \frac{60y}{100} = 0$

$\Rightarrow y + \frac{3y}{5} = 60 \Rightarrow \frac{8y}{5} = 60$

$y = \frac{60 \times 5}{8} = \frac{75}{2} = 37\frac{1}{2}\%$

160. (2) Using Rule 10,
Increase percent in area

$= \left(10 + 10 + \frac{10 \times 10}{100}\right)\% = 21\%$

161. (2) Using Rule 10,

Net % effect $= \left(x - y - \frac{xy}{100}\right)\%$

$= \left(5 - 10 - \frac{5 \times 10}{100}\right)\%$

= (–5 – 0.5)% = – 5.5%
The negative sign shows decrease.

162. (4) Using Rule 10,
%Effect on area

$= \left(1 + 1 + \frac{1 \times 1}{100}\right)\% = 2.01\%$

163. (3) Using Rule 10,
Required net effect

$= \left(x + y + \frac{xy}{100}\right)\%$

Negative sign shows decrease

$= \left(5 - 2 - \frac{5 \times 2}{100}\right)\% = 2.9\%$

164. (4) Using Rule 10,
Percentage increase in area

$= \left(30 + 20 + \frac{30 \times 20}{100}\right)\% = 56\%$

165. (4) Using Rule 10,
Required percentage increase

$= \left(40 + 40 + \frac{40 \times 40}{100}\right)\% = 96\%$

Or Let edge = 10, S. Area = 600, New edge = 14 ⇒ New surface area = $6 \times 14^2 = 6 \times 196 = 1176$.

% increase $= \left(\frac{1176 - 600}{600}\right) 100$

$= \frac{576}{6} = 96\%$.

166. (1) Using Rule 10,
Required percentage increase

$= \left(8 + 8 + \frac{8 \times 8}{100}\right)\% = 16.64\%$

167. (1) Using Rule 10,
If the required percentage be x, then

$30 - x - \frac{30x}{100} = 0$

$\Rightarrow 300 - 10x - 3x = 0$

$\left(\begin{array}{c}\text{Percentage}\\ \text{Effect}\\ = \left(x + y + \frac{xy}{100}\right)\%\end{array}\right)$

$\Rightarrow 13x = 300$

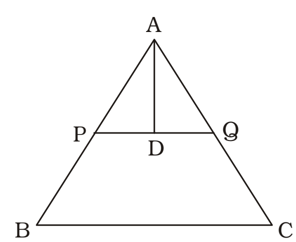
$\Rightarrow x = \frac{300}{13} = 23\frac{1}{13}\%$

168. (3) Using Rule 10,
Percentage increase in area

$= \left(100 + 100 + \frac{100 \times 100}{100}\right)\%$

= 300%

169. (3) Using Rule 6,

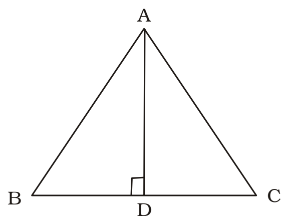


PQ Ω BC
∠APQ = ∠ABC = 60°
∠AQP = ∠ACB = 60°

$\therefore$ Area of $\Delta APQ = \frac{\sqrt{3}}{4} \times (PQ)^2$

$= \frac{\sqrt{3}}{4} \times (5)^2 = \frac{25\sqrt{3}}{4}$ sq.cm.

170. (3) Using Rule 1,



AD = b

Let BD = DC = x

Each angle = 60°

[$\because \Delta$ is equilateral]

$\therefore \tan 60° = \frac{AD}{BD}$

$\Rightarrow \sqrt{3} = \frac{b}{x} \Rightarrow x = \frac{b}{\sqrt{3}}$

$\Rightarrow BC = 2x = \frac{2b}{\sqrt{3}}$

$\therefore$ Area of the triangle

$= \frac{1}{2} \times BC \times AD$

$a = \frac{1}{2} \times \frac{2b}{\sqrt{3}} \times b$

$\Rightarrow \frac{b^2}{a} = \sqrt{3}$

Let AB = BC = AC = S Area of equilateral Δ i.e. $a = \frac{\sqrt{3}}{4}S^2$

Also AD (height)

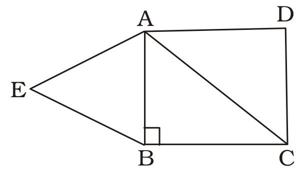
$= \sqrt{S^2 - \left(\frac{S}{2}\right)^2} = \sqrt{S^2 - \frac{S^2}{4}} = \sqrt{\frac{3S^2}{4}}$

$\Rightarrow b = \frac{\sqrt{3}\,S}{2} \quad \therefore \frac{b^2}{a}$

$= \frac{\left(\frac{\sqrt{3}\,S}{2}\right)^2}{\frac{\sqrt{3}}{4}S^2} = \frac{3S^2}{4} \times \frac{4}{\sqrt{3}\,S^2}$

$= \frac{3}{\sqrt{3}} = \sqrt{3}$

171. (3) Using Rule 6,



AB = x units

BC = x units

AC = $\sqrt{2}\,x$ units

[Using Pythagorus]

$\therefore \frac{\Delta ABE}{\Delta ACD} = \frac{\frac{\sqrt{3}}{4}x^2}{\frac{\sqrt{3}}{4}\left(\sqrt{2}x\right)^2}$

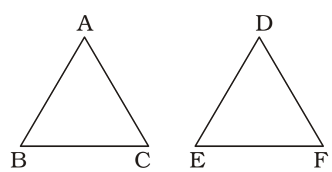
$= \frac{1}{2} = 1 : 2$

172. (2) $\frac{\Delta ABC}{\Delta DEF} = \frac{AB^2}{DE^2} = \frac{100}{64} = \frac{25}{16}$

= 25 : 16

[$\because \Delta ABC \sim \Delta DEF$]

173. (3)



$\Delta ABC \sim \Delta DEF$

$\therefore \frac{\Delta ABC}{\Delta DEF} = \frac{3^2}{4^2} \Rightarrow \frac{54}{\Delta DEF} = \frac{9}{16}$

$\Rightarrow \Delta DEF = \frac{16 \times 54}{9}$

= 96 sq.cm.

174. (2) $\frac{\Delta ABC}{\Delta DEF} = \frac{AB^2}{DE^2}$

$\Rightarrow \frac{20}{45} = \frac{25}{DE^2}$

$\Rightarrow DE^2 = \frac{45 \times 25}{20} = \frac{225}{4}$

$\therefore DE = \frac{15}{2} = 7.5$ cm

175. (1) Join AC & DQ

$\because$ ΔAPC and ΔBCP lie on the same base PC and between the same parallels AB and PC

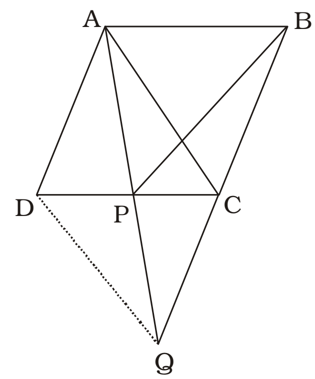
$\therefore$ ar (ΔAPC) = ar (ΔBCP)

Now,

AD $\parallel$ CQ and AD = CQ ...(i)

$\therefore$ ADQC is a parallelogram.

Again ΔADC and ΔDAQ are on the same base AD and between same parallels AD and CQ.



$\therefore$ ar (ΔADC) = ar (ΔADQ)

Subtracting ar (DAP) from both sides, we get

ar (ΔAPC) = ar (ΔDPQ) ...(ii)

From (i) and (ii), we get ar (ΔBPC) = ar (ΔDPQ)

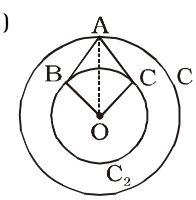
176. (4) Using Rule 13,

Area of the trapezium = $\frac{1}{2}$ (sum of parallel sides) × altitude

$\Rightarrow 450 = \frac{1}{2}(3x + 2x) \times 15$

$\Rightarrow 5x = \frac{450 \times 2}{15} = 60$ cm

177. (1)



AB = AC = tangents from the same point

OB = OC = 3 cm

OA = 12 cm

$\angle ABO = 90°$

$\therefore AB = \sqrt{12^2 - 3^2}$

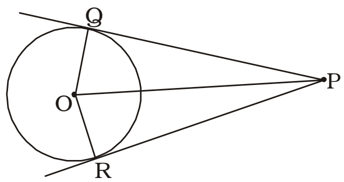
$= \sqrt{15 \times 9} = 3\sqrt{15}$

$\Delta OAB = = \frac{1}{2}$ OB × AB

$= \frac{1}{2} \times 3 \times 3\sqrt{15} = \frac{9\sqrt{15}}{2}$

$\therefore$ Area of OABC = $\frac{9\sqrt{15}}{2}$ sq.cm.

178. (2)



$\angle OQP = \angle ORP = 90°$

$PQ = \sqrt{OP^2 - OQ^2}$

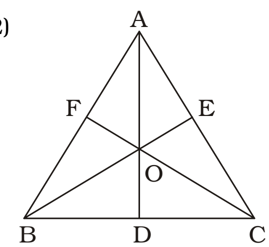
$= \sqrt{13^2 - 5^2} = 12$

$\therefore$ Area of PQOR = 2 × Δ OPQ

$= 2 \times \frac{1}{2} \times 5 \times 12$

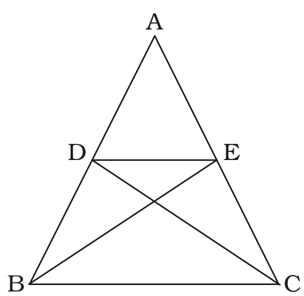
= 60 sq. cm

179. (2)



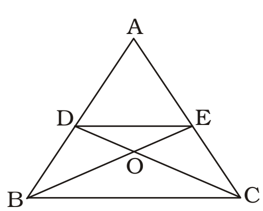
$ar(\Delta AOE) = ar(\Delta BOD)$
$= ar(\Delta BOF)$
Area of quadrilateral BDOF
= 2 × 15 = 30 sq.cm.

180. (2)



ΔDBC and ΔEBC lie on the same base and between same parallel lines.
$\therefore$ ΔDBC = ΔBEC
$\Rightarrow$ ΔABC ~ ΔDBC
$\Rightarrow$ ΔABC ~ ΔBEC
$\Rightarrow$ ΔADE = ΔABE = 36 sq.cm

181. (3)



In Δs ODE and BOC,
$\angle BOC = \angle DOE$
$\angle DEO = \angle OBC$; $\angle ODE = \angle OCB$
$\therefore$ Both triangles are similar,

$\therefore \frac{\Delta ODE}{\Delta BOC} = \frac{DE^2}{BC^2}$

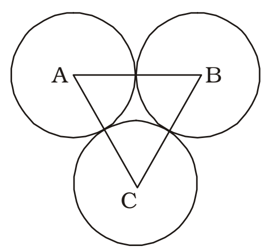
DE ∥ BC and DE = $\frac{1}{2}$BC

and area of Δ ABC
= 3 × Area of Δ OBC

$\therefore \frac{\Delta\ ODE}{\Delta\ ABC} = \frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$

or, 1 : 12

182. (4) Using Rule 1,



AB = 4 + 6 = 10 cm
BC = 6 + 8 = 14 cm
CA = 8 + 4 = 12 cm
$\therefore$ Semi-perimeter

$= \frac{10+14+12}{2} = 18$ cm

Area = $\sqrt{s(s-a)(s-b)(s-c)}$

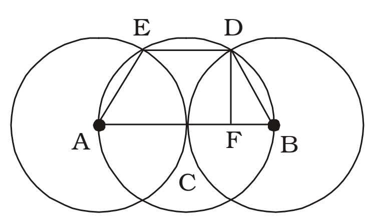
$= \sqrt{18(18-10)(18-14)(18-12)}$

$= \sqrt{18 \times 8 \times 4 \times 6}$

$= 3 \times 2 \times 2 \times 2\sqrt{6}$

$= 24\sqrt{6}$ sq.cm.

183. (2) Using Rule 13,



ABDE will be a trapezium
AB = 4 units

DE = $\frac{1}{2}$ AB = 2 units

FB = 1 unit, BD = 2 units.

$\therefore$ DF = $\sqrt{2^2 - 1^2} = \sqrt{3}$ units

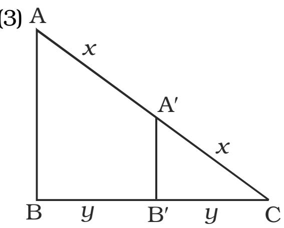
$\therefore$ Area of ABDE

$= \frac{1}{2}(AB + DE) \times DF$

$= \frac{1}{2}(4 + 2) \times \sqrt{3}$

$= 3\sqrt{3}$ sq. units

184. (3)



Δ A′B′C ~ ΔABC
$\angle C = \angle C$,

$\frac{CA'}{CA} = \frac{1}{2}$ *and* $\frac{CB'}{CB} = \frac{1}{2}$

and

$\therefore \frac{\Delta ABC}{\Delta A'B'C} = \frac{(2x)^2}{x^2} = \frac{4}{1}$

[$\because$ BC = 2B′C and AC = 2A′C]

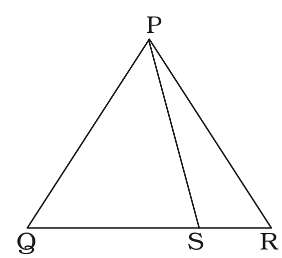
$\Rightarrow \frac{\Delta A'B'C}{\Delta ABC} = \frac{1}{4}$

$\Rightarrow 1 - \frac{\Delta A'B'C}{\Delta ABC} = 1 - \frac{1}{4}$

$\Rightarrow \frac{\square AA'B'C}{\Delta ABC} = \frac{3}{4} = 3 : 4$

185. (1) Both the triangles are congruent.
$\therefore$ Δ ABC = 60 sq.cm.
Δ PQR = 60 sq.cm.

186. (4) Using Rule 1,



QR = 4.5 cm
SR = 1.5 cm
$\therefore$ QS = 4.5 – 1.5 = 3 cm

$\frac{\Delta PQS}{\Delta PSR} = \frac{\frac{1}{2} \times h \times QS}{\frac{1}{2} \times h \times SR}$

$= \frac{3}{1.5} = 2 : 1$

187. (2) Using Rule 14,
Radius of the larger circle
= R cm
Radius of the smaller circle
= r cm
$\therefore$ R – r = 14 cm
and π ($R^2 - r^2$) = 1056

$\Rightarrow R^2 - r^2 = \frac{1056}{\pi} = \frac{1056 \times 7}{22}$

$\Rightarrow R^2 - r^2 = 336$

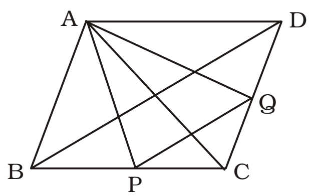
$\Rightarrow (R + r)(R - r) = 336$

$\Rightarrow R + r = \frac{336}{14} = 24$ cm

$\therefore (R + r) - (R - r) = 24 - 14$

$\Rightarrow 2r = 10 \Rightarrow r = 5$ cm

188. (3)

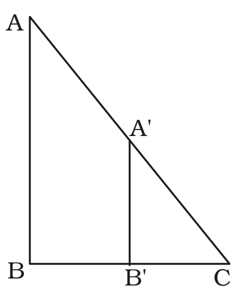


Δ APQ = $\frac{3}{8}$ ($\square$ ABCD)

= $\frac{3}{4}$ Δ ABC

= $\frac{3}{4} \times 12$ = 9 sq.cm.

189. (3) Using Rule 1,



In Δ ABC and Δ A' B' C
A' B' || AB
$\angle$ B' = $\angle$ B, $\angle$ A' = $\angle$ A
$\therefore$ Δ ABC ~ Δ A' B' C

$\therefore$ A' B' = $\frac{1}{2}$ AB.

$\therefore$ Area of Δ A' B' C

= $\frac{1}{2}$ × B' C × A' B'

= $\frac{1}{2} \times \frac{1}{2}$ BC × $\frac{1}{2}$ AB

= $\frac{1}{4}$ ($\frac{1}{2}$ × BC × AB)

= $\frac{1}{4}$ × Area of Δ ABC

190. (2) Using Rule 14,
Circumference of circle
= $2\pi r = 44$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44$

$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7$ cm.

Area of circle = πr^2

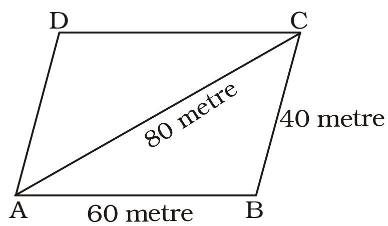
= $\frac{22}{7} \times 7 \times 7$ = 154 sq. cm.

Perimeter of square = 44 cm.

Side of square = $\frac{44}{4}$ = 11cm.

Area of square = 11 × 11
= 121 sq. cm.
Difference = 154 – 121
= 33 sq. cm.

191. (2) Using Rule 1,



Semiperimeter of Δ ABC(s)

= $\frac{a + b + c}{2}$

= $\frac{60 + 40 + 80}{2}$ = 90 metre

$\therefore$ Area of Δ ABC

= $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{90\ (90-60)\ (90-40)\ (90-80)}$

= $\sqrt{90 \times 30 \times 50 \times 10}$

= $\sqrt{3 \times 30 \times 30 \times 5 \times 10 \times 10}$

= $30 \times 10\sqrt{15}$

= $300\sqrt{15}$ sq. metre

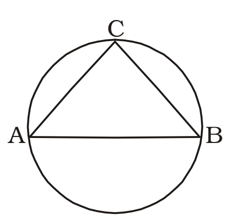
$\therefore$ Area of $\square$ ABCD

= 2 × Area of Δ ABC

= $2 \times 300\sqrt{15}$

= $600\sqrt{15}$ sq. metre

192. (4)



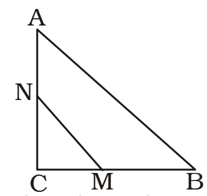
Angle at the semi-circle is a right angle.

$\therefore \angle ACB = 90°$
AB = 5 cm.
AC = $3x$ cm. BC = $4x$ cm.
$\therefore (3x)^2 + (4x)^2 = (5)^2$
$\Rightarrow 9x^2 + 16x^2 = 25 \Rightarrow 25x^2 = 25$
$\Rightarrow x^2 = 1$
$\Rightarrow x = 1$

$\therefore$ Area of Δ ABC = $\frac{1}{2}$ × BC × AC

= $\frac{1}{2}$ × 4 × 3 = 6 sq.cm.

193. (1)

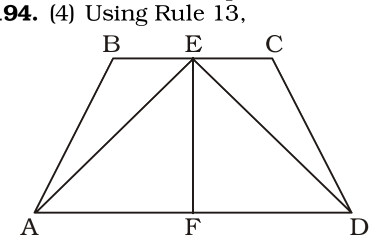


$\because 8^2 + 6^2 = 10^2$
$\therefore$ Δ ABC is a right angled triangle.
CM = MB = 4 cm.
N is the mid point of AC.
$\therefore$ CN = 3 cm.
$\therefore$ Area of trapezium ABMN
= Area of Δ ABC – Area of Δ CMN

= $\frac{1}{2} \times 6 \times 8 - \frac{1}{2} \times 3 \times 4$

= 24 – 6 = 18 sq. cm.

194. (4) Using Rule 13,



EF is perpendicular on side AD.
$\therefore$ Area of trapezium

= $\frac{1}{2}$(AD + BC) × EF

Area of ΔAED = $\frac{1}{2}$ × AD × EF

$\therefore$ Required ratio

= $\frac{\frac{1}{2}(AD + BC) \times EF}{\frac{1}{2} \times AD \times EF}$

= $\frac{AD + BC}{AD}$

195. (1) Using Rule 18, 6 and 14,

In-radius = $\frac{a}{2\sqrt{3}}$

= $\frac{24}{2\sqrt{3}} = 4\sqrt{3}$ cm

Area of triangle $= \frac{\sqrt{3}}{4} \times (\text{side})^2$

$= \frac{\sqrt{3}}{4} \times 24 \times 24$

$= 144\sqrt{3}$ sq.cm. $= 144 \times 1.732$

$= 249.408$ sq.cm.

Area of circle $= \pi r^2$

$= \frac{22}{7} \times 4\sqrt{3} \times 4\sqrt{3}$

$= \frac{1056}{7} = 150.86$ sq.cm.

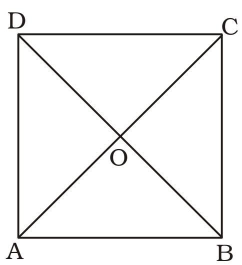
Area of remaining part

$= (249.408 - 150.86)$ sq.cm.

$= 98.548$ sq.cm.

≈ 98.55 sq.cm.

196. (3) Using Rule 12,



Side of a rhombus

$= \frac{2p}{4} = \frac{p}{2}$ units

OA = OC = y (let)

$\therefore$ AC = $2y$ units

OB = OD = x (let)

$\therefore$ BD = $2x$ units

From Δ OAB,

$\angle AOB = 90°$

$AB^2 = OA^2 + OB^2$

$\Rightarrow \frac{p^2}{4} = x^2 + y^2$

$\Rightarrow p^2 = 4x^2 + 4y^2$ ...(i)

and $2x + 2y = m$

On squaring both sides,

$4x^2 + 4y^2 + 8xy = m^2$

$\Rightarrow p^2 + 8xy = m^2$

$\Rightarrow 8xy = m^2 - p^2$

$\Rightarrow 4xy = \frac{1}{2}(m^2 - p^2)$

$\therefore$ Area of the rhombus

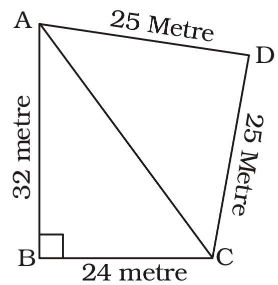
$= \frac{1}{2} \times AC \times BD$

$= \frac{1}{2} \times 2x \times 2y = \frac{1}{2} \times 4xy$

$= \frac{1}{2} \times \frac{1}{2} (m^2 - p^2)$

$= \frac{1}{4}(m^2 - p^2)$ sq. units

197. (4) Using Rule 1,



AC $= \sqrt{AB^2 + BC^2}$

$= \sqrt{32^2 + 24^2}$

$= \sqrt{1024 + 576}$

$= \sqrt{1600} = 40$ metre

$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times BC \times AB$

$= \frac{1}{2} \times 24 \times 32$

$= 384$ sq. metre

Semi-peri meter of Δ ADC (s)

$= \frac{25 + 25 + 40}{2}$

$= \frac{90}{2} = 45$ metre

$\therefore$ Area of ΔADC

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{45(45-25)(45-25)(45-40)}$

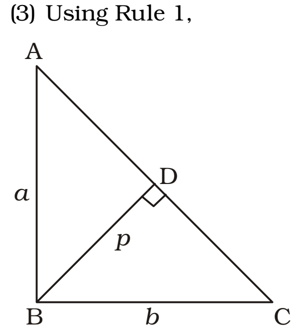
$= \sqrt{45 \times 20 \times 20 \times 5} = 20 \times 15$

$= 300$ sq. metre

$\therefore$ Area of the plot $= 384 + 300$

$= 684$ sq.metre

198. (3) Using Rule 1,



BD $\perp$ AC

AB $\perp$ BC

Hypotenuse of ΔABC

$= \sqrt{AB^2 + BC^2}$

$= \sqrt{a^2 + b^2}$

Area of ΔABC $= \frac{1}{2} \times AB \times BC$

$= \frac{1}{2} \times AC \times BD$

$\Rightarrow AB \times BC = AC \times BD$

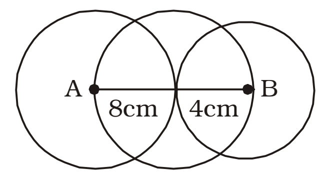
$\Rightarrow ab = \sqrt{a^2 + b^2} \times p$

On squaring both sides,

$a^2b^2 = (a^2 + b^2)\, p^2$

$\therefore p^2 = \frac{a^2b^2}{a^2 + b^2}$

199. (1) Using Rule 14,



Diameter $= AB = 8 + 4 = 12$ units

Radius $= \frac{12}{2} = 6$ units

$\therefore$ Area of circle $= \pi r^2 = \pi \times 6^2$

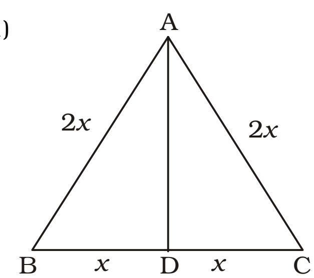
$= 36\pi$ sq. units

200. (4) Using Rule 10,

Change in area $= \frac{-10 \times 10}{100} = -1$ %

Negative sign shows decrease.

201. (1)



AB = $2x$ units

BD = DC = x units

AD $= \sqrt{AB^2 - BD^2}$

$= \sqrt{4x^2 - x^2}$

$= \sqrt{3x^2}$

$= \sqrt{3}x$ units

Area of ΔABC $= \frac{\sqrt{3}}{4} \times (2x)^2$

According to question,

$\because \frac{\sqrt{3}}{4} \times (2x)^2 = \sqrt{3}x$

$\Rightarrow \frac{\sqrt{3}}{4} \times 4x^2 = \sqrt{3}x$

$\Rightarrow x^2 = x \Rightarrow x(x-1) = 0$

$\Rightarrow x = 1$ Hence length of side $2 \times 1 = 2$ units

$\therefore$ Length of side = 9 units

202. (1) Length of side of square $= 2x$ units

Diameter of circle $= 2x$ units

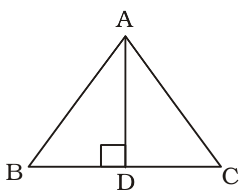
Radius $= x$ units

$\therefore$ Required ratio $= 4x^2 : \pi x^2$

$= 4 : \frac{22}{7}$

$= 14 : 11$

203. (4) Using Rule 6,



AB = BC = AC = a cm

AD = Median = $6\sqrt{3}$ cm.

$\therefore \frac{\sqrt{3}}{2} a = 6\sqrt{3}$

$\Rightarrow a = \frac{6\sqrt{3} \times 2}{\sqrt{3}} = 12$ cm.

$\therefore$ Area of Δ ABC $= \frac{\sqrt{3}}{4} \times \text{side}^2 =$

$\frac{\sqrt{3}}{4} \times 12 \times 12$

$= 36\sqrt{3}$ sq. cm.

204. (2) Using Rule 14,

Radius of circle = r units

According to question,

Area of circle = circumference of circle

$\Rightarrow \pi r^2 = 2\pi r$

$\Rightarrow r = 2$ units

$\therefore$ Area of circle $= \pi r^2$

$= 4\pi$ sq. units

205. (*) Using Rule 6,

Area of equilateral triangle $=$

$\frac{\sqrt{3}}{4} \times (\text{side})^2$

$\Rightarrow \frac{\sqrt{3}}{4} \times (\text{side})^2 = 48$

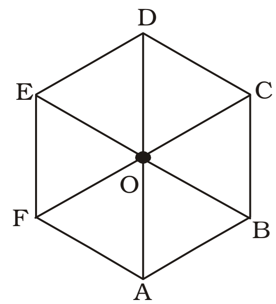
$(\text{Side})^2 = \frac{48 \times 4}{\sqrt{3}}$

$= \frac{16 \times \sqrt{3} \times \sqrt{3} \times 4}{\sqrt{3}} = 64\sqrt{3}$

$\therefore$ Side $= \sqrt{64\sqrt{3}} = 8\sqrt[4]{3}$ cm

206. (3) Using Rule 6,

Area of regular hexagon



6 equilateral triangles

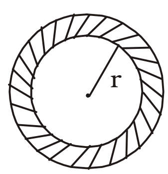
$= 6 \times \frac{\sqrt{3}}{4} (\text{side})^2$

$= \frac{3\sqrt{3}}{2} a^2$

$= \frac{3\sqrt{3} \times \sqrt{3}}{2\sqrt{3}} a^2$

$= \frac{9}{2\sqrt{3}} a^2$ sq. units

207. (2)



In-radius of circular plot $= r$ metre (let)

Width of path $= x$ metre

$\therefore$ Ex radius $= (r + x)$ metre

According to the question

$2\pi(r + x) - 2\pi r = 33$

$\Rightarrow 2\pi r + 2\pi x - 2\pi r = 33$

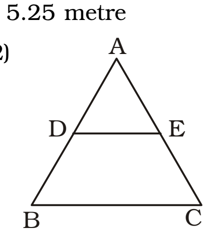
$\Rightarrow 2\pi x = 33$

$\Rightarrow 2 \times \frac{22}{7} \times x = 33$

$\Rightarrow x = \frac{33 \times 7}{2 \times 22} = \frac{21}{4}$ metre

$= 5.25$ metre

208. (2)



DE || BC

$\therefore \angle ADE = \angle ABC$

$\angle AED = \angle ACB$

$\therefore \Delta ADE \sim \Delta ABC$

$\therefore \frac{AD}{BD} = \frac{2}{3}$

$\Rightarrow \frac{BD}{AD} = \frac{3}{2}$

$\Rightarrow \frac{BD}{AD} + 1 = \frac{3}{2} + 1$

$\Rightarrow \frac{BD + AD}{AD}$

$= \frac{3+2}{2} \Rightarrow \frac{AB}{AD} = \frac{5}{2}$

$\therefore \frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \frac{AD^2}{AB^2}$

$= \left(\frac{2}{5}\right)^2 = \frac{4}{25}$

$\Rightarrow 1 - \frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC}$

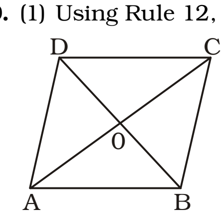
$= 1 - \frac{4}{25}$

$\Rightarrow \frac{\text{Area of } \Delta ABC - \text{Area of } \Delta ADE}{\text{Area of } \Delta ABC}$

$= \frac{25-4}{25}$

$\therefore \frac{\text{Area of trapezium DECB}}{\text{Area of } \Delta ABC} = \frac{21}{25}$

209. (1) Using Rule 12,



AB = BC = CD = DA = 10 cm

AC = 16 cm

In ΔOAB

OA = 8 cm

AB = 10 cm

$\angle AOB = 90°$

$\therefore OB = \sqrt{AB^2 - OA^2}$

$= \sqrt{10^2 - 8^2}$

$= \sqrt{(10+8)(10-8)}$

$= \sqrt{18 \times 2} = \sqrt{36} = 6$ cm

$\therefore$ BD $= 2 \times$ OB $= 2 \times 6 = 12$ cm

$\therefore$ Area of rhombus ABCD

$= \frac{1}{2} d_1 \times d_2$

$= \frac{1}{2} \times 16 \times 12 = 96$ sq.cm.

210. (2) Using Rule 1,
Ratio of the lengths of sides
= 5 : 6 : 7
Sum of ratios = 5 + 6 + 7 = 18

$\therefore$ Sides $\Rightarrow \frac{5}{18} \times 54$ = 15 metre;

$\frac{6}{18} \times 54$ = 18 metre;

$\frac{7}{18} \times 54$ = 21 metre;

Semi-perimeter (s)

$= \frac{15+18+21}{2}$

$= \frac{54}{2} = 27$

$\therefore$ Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{27\,(27-15)\,(27-18)\,(27-21)}$

$= \sqrt{27 \times 12 \times 9 \times 6}$

$= \sqrt{3 \times 3 \times 3 \times 2 \times 2 \times 3 \times 3 \times 3 \times 2 \times 3}$

$= 3 \times 3 \times 3 \times 2\sqrt{6}$

$= 54\sqrt{6}$ sq.metre

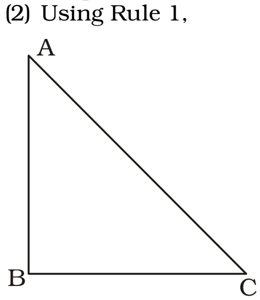
211. (2) Using Rule 13,
Area of trapezium

$= \frac{1}{2}$(sum of parallel sides) × perpendicular distance

$= \frac{1}{2}(6+8) \times 4 = \frac{1}{2} \times 14 \times 4$

= 28 sq. cm.

212. (2) Using Rule 1,



BC = a units, AB = b units

$AC = \sqrt{a^2 + b^2} = 10$

$\Rightarrow a^2 + b^2 = 100$ ....(i)

Area of Δ ABC

$= \frac{1}{2}$ × base × height

$= \frac{1}{2}\ ab$

$\therefore \frac{1}{2}\ ab = 20$

$\Rightarrow ab = 40$ square units ....(ii)

$\therefore (a + b)^2 = a^2 + b^2 + 2ab$

$= 100 + 2 \times 40 = 180$ square units

213. (1) Using Rule 14,
If the radius of circle be r cm, then

$\pi r^2 = 154$

$\Rightarrow \frac{22}{7}r^2 = 154$

$\Rightarrow r^2 = \frac{154 \times 7}{22} = 7 \times 7$

$\therefore r = 7$ cm

$\therefore$ Length of wire $= 2\pi r$

$= 2 \times \frac{22}{7} \times 7 = 44$ cm

= Perimeter of equilateral triangle

$\therefore$ Side of equilateral triangle

$= \frac{44}{3}$ cm

$\therefore$ Area of equilateral triangle

$= \frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times \frac{44}{3} \times \frac{44}{3}$

$= \frac{1.732 \times 44 \times 11}{9} = \frac{838.288}{9}$

≈ 93.14 sq.cm.

214. (2) Using Rule 1,

Area of triangle $= \frac{1}{2}$ × base × height $= \frac{1}{2}$bh

$\therefore \frac{\frac{1}{2}b_1h_1}{\frac{1}{2}b_2h_2} = \frac{4}{3}$

$\Rightarrow \frac{b_1 \times 3}{b_2 \times 4} = \frac{4}{3}$

$\Rightarrow \frac{b_1}{b_2} = \frac{4 \times 4}{3 \times 3} = \frac{16}{9}$

215. (3) A = 10^2 = 100 sq. cm.

B $= \frac{1}{2} \times 14^2$ = 98 sq. cm.

$\therefore$ A – B = 100 – 98

= 2 sq. cm.

216. (3) Using Rule 1,
Area of parallelogram = base × height
= 25 × 10 = 250 sq. cm.
If the required altitude be x cm, then
$x \times 20 = 250$

$\Rightarrow x = \frac{250}{20}$ = 12.5 cm.

217. (3) Using Rule 6,
Side of equilateral triangle = x metre

$\therefore$ Difference of area $= \sqrt{3}$

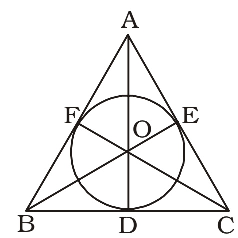
$\Rightarrow \frac{\sqrt{3}}{4}\ [(x+1)^2 - x^2] = \sqrt{3}$

$\Rightarrow x^2 + 2x + 1 - x^2 = 4$

$\Rightarrow 2x + 1 = 4$

$\Rightarrow 2x = 3 \Rightarrow x = \frac{3}{2}$ metre

218. (1) Using Rule 1,



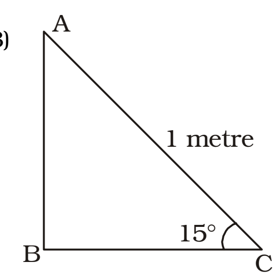
OD = OE = OF = 6 cm.
Area of triangle ABC
= Area of (Δ AOB + Δ BOC + Δ AOC)

$= \frac{1}{2}$ AB × OF + $\frac{1}{2}$ BC × OD + $\frac{1}{2}$ AC × DE

$= \frac{1}{2}$ × 6 (AB + BC + CA)

$= \frac{1}{2}$ × 6 × 50 = 150 square cm.

219. (3)



sin 15° = sin (45° – 30°)
= sin 45° × cos 30° – cos 45° × sin 30°

$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}} \times \frac{1}{2}$

$= \frac{\sqrt{3}}{2\sqrt{2}} - \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}-1}{2\sqrt{2}}$

and cos 15° = cos (45°– 30°)
= cos 45°. cos 30° + sin 45°. sin 30°

$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2}$

$= \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}+1}{2\sqrt{2}}$

$\therefore$ AB = AC sin 15°

$= \frac{\sqrt{3}-1}{2\sqrt{2}}$ metre,

BC = AC cos 15° = $\frac{\sqrt{3}+1}{2\sqrt{2}}$ metre

$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times AB \times BC$

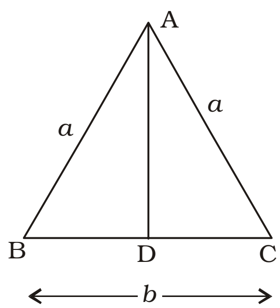
$= \left(\frac{1}{2} \times \frac{\sqrt{3}-1}{2\sqrt{2}} \times \frac{\sqrt{3}+1}{2\sqrt{2}}\right)$ square metre

$= \left(\frac{3-1}{16}\right)$ square metre

$= \frac{1}{8}$ square metre.

$= \frac{10000}{8} = 1250$ square cm.

220. (3)



AD, is perpendicular on BC.

BD = DC = $\frac{b}{2}$

AD = $\sqrt{AB^2 - BD^2}$

$= \sqrt{a^2 - \left(\frac{b}{2}\right)^2} = \sqrt{a^2 - \frac{b^2}{4}}$

$= \frac{\sqrt{4a^2 - b^2}}{2}$ units

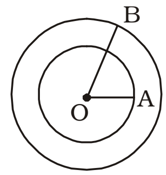
$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times BC \times AD$

$= \frac{1}{2} b \times \frac{\sqrt{4a^2 - b^2}}{2}$

$= \frac{b}{4} \sqrt{4a^2 - b^2}$ square units.

221. (3)

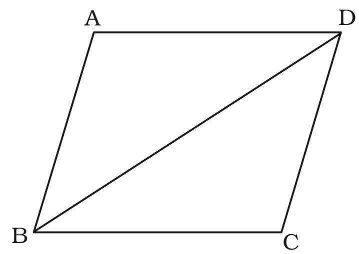


OA = $\frac{700}{2}$ = 350 metre

OB = $\frac{728}{2}$ = 364 metre

Width of path = OB – OA
= 364 – 350 = 14 metre

222. (4) Using Rule 1,



In Δ ABD, AB = 20 cm. AD = 30 cm.
BD = 40 cm.

$\therefore$ Semi–Perimeter (s)

$= \frac{a+b+c}{2} = \frac{20+30+40}{2}$

= 45 cm

$\therefore$ Area of Δ ABD

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{45(45-20)(45-30)(45-40)}$

$= \sqrt{45 \times 25 \times 15 \times 5}$

$= \sqrt{5 \times 3 \times 3 \times 5 \times 5 \times 5 \times 3 \times 5}$

$= \sqrt{5^2 \times 5^2 \times 5 \times 3^2 \times 3}$

$= 5 \times 5 \times 3 \sqrt{15}$

$= 75\sqrt{15}$ square cm.

$\therefore$ Area of parallelogram ABCD

$= 2 \times 75\sqrt{15}$

$= 150\sqrt{15}$ square cm.

223. (4) Using Rule 10,
Side of the given square
= x cm (let)
Side of new square

$= \frac{3x}{2}$ cm. (let)

$\therefore$ Required ratio of areas

$= \left(\frac{3x}{2}\right)^2 : x^2 = \frac{9x^2}{4} : x^2$

= 9 : 4

224. (1) Using Rule 14,
Area of circle = πr^2
$\Rightarrow \pi r^2 = 324\pi$
$\Rightarrow r^2 = 324$

$\therefore r = \sqrt{324} = 18$ cm.

$\therefore$ Length of longest chord of circle = Diameter
= 2 × 18 = 36 cm.

225. (1) Using Rule 12,
One diagonal of rhombus
= $d_1 = x$ cm.
Second diagonal = $d_2 = 2x$ cm.

Area of rhombus = $\frac{1}{2} d_1 . d_2$

$\therefore \frac{1}{2} d_1.d_2 = 256$

$\Rightarrow \frac{1}{2} x . 2x = 256$

$\Rightarrow x^2 = 256$

$\Rightarrow x = \sqrt{256} = 16$ cm.

$\therefore$ Larger diagonal = $2x$
= 2 × 16 = 32 cm.

226. (3) Using Rule 10,
Diagonal of square

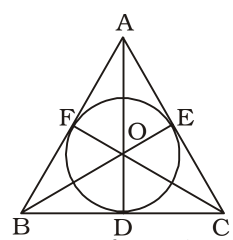
$= \sqrt{2} \times$ side

$\Rightarrow \frac{3-x}{\sqrt{2}} = \sqrt{2} \times \frac{1}{2}(x+1)$

$\Rightarrow 3 - x = \sqrt{2} \times \sqrt{2} \times \frac{1}{2}(x+1)$

$\Rightarrow 3 - x = x + 1$
$\Rightarrow x + x = 3 - 1$
$\Rightarrow 2x = 2 \Rightarrow x = 1$ unit

227. (2)



The centre of incircle is point 'O'.
OD = OE = OF = r
$\therefore 2\pi r = 44$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44$

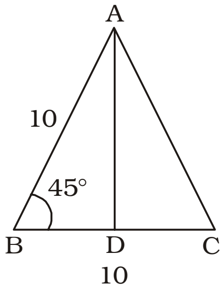
$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7$ cm.

$\therefore$ Area of Δ ABC

$= \frac{1}{2}$ (AB + BC + CA) × r

$= \frac{1}{2} \times 24 \times 7 = 84$ square cm.

228. (3)



$AD = AB \sin 45° = 10 \times \frac{1}{\sqrt{2}}$

$= 5\sqrt{2}$ cm.

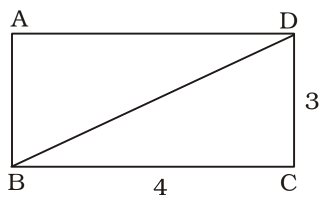
$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times BC \times AD$

$= \frac{1}{2} \times 10 \times 5\sqrt{2}$

$= 25\sqrt{2}$ square cm.

229. (3)

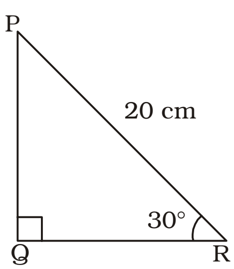


$BD = \sqrt{BC^2 + CD^2}$

$= \sqrt{4^2 + 3^2} = \sqrt{16+9} = \sqrt{25}$

= 5 metre

230. (1)



$\sin 30° = \frac{PQ}{PR}$

$\Rightarrow \frac{1}{2} = \frac{PQ}{20}$

$\Rightarrow PQ = 20 \times \frac{1}{2} = 10$ cm.

$\cos 30° = \frac{QR}{PR}$

$\Rightarrow \frac{\sqrt{3}}{2} = \frac{QR}{20}$

$\Rightarrow QR = \frac{\sqrt{3}}{2} \times 20 = 10\sqrt{3}$ cm.

$\therefore$ Area of triangle PQR

$= \frac{1}{2} \times 10 \times 10\sqrt{3}$

$= 50\sqrt{3}$ square cm.

231. (1) Using Rule 6,
Side of the equilateral triangle = x units (let)
According to the question,
$3x = 2\pi r$

$\Rightarrow x = \frac{2}{3}\pi r$

$\therefore$ Area of equilateral triangle

$= \frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times \left(\frac{2}{3}\pi r\right)^2$

$= \frac{\sqrt{3}}{4} \times \frac{4}{9}\pi^2 r^2$

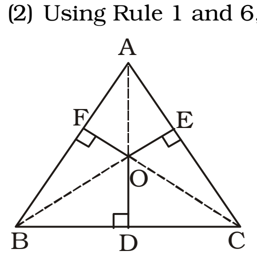
$= \frac{\pi^2 r^2}{3\sqrt{3}}$ sq. units.

$\therefore$ Required ratio $= \frac{\pi^2 r^2}{3\sqrt{3}} : \pi r^2$

$= \pi : 3\sqrt{3}$

$= \frac{22}{7} : 3\sqrt{3} = 22 : 21\sqrt{3}$

232. (2) Using Rule 1 and 6,



OD = a cm., OE = b cm.
OF = c cm.
BC = AC = AB
Area of Δ ABC
= Area of (ΔBOC + ΔCOE + ΔBOA)

$= \frac{1}{2} \times BC \times a + \frac{1}{2} AC \times b + \frac{1}{2} \times AB \times c$

$= \frac{1}{2} BC(a + b + c)$ ...(i)

($\because$ AB = BC = CA)

Again, Area of Δ ABC

$= \frac{\sqrt{3}}{4} \times BC^2$

$\therefore \frac{\sqrt{3}}{4} \times BC^2 = \frac{1}{2} BC(a + b + c)$

$\Rightarrow BC = \frac{2}{\sqrt{3}}(a + b + c)$

$\therefore$ Required area

$= \frac{1}{2} \times \frac{2}{\sqrt{3}}(a + b + c)^2$

[From equation (i)]

$= \frac{\sqrt{3}}{\sqrt{3} \times \sqrt{3}}(a + b + c)^2$

$= \frac{\sqrt{3}}{3}(a + b + c)^2$ sq. units

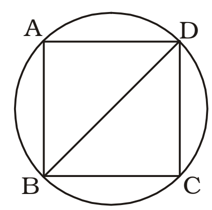
233. (3) Using Rule 14,
Area of circle = πr^2
Area of square = x^2
According to the question,

$x^2 = \pi r^2 \Rightarrow x = \sqrt{\pi}\, r$

$\therefore$ Required ratio $= \frac{x}{r} = \frac{\sqrt{\pi} r}{r}$

$= \sqrt{\pi} : 1$

234. (4) Using Rule 10 and 14,

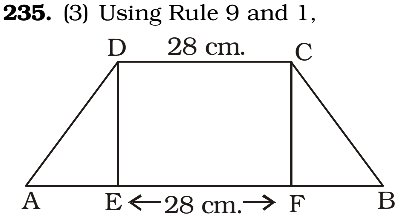


Radius of circle = r units
Area of circle = πr^2 sq. units
In square ABCD
Diagonal = BD = $2r$ units
$\therefore$ Area of square

$= \frac{1}{2} \times (2r)^2 = 2r^2$

$\therefore$ Required difference = $\pi r^2 - 2r^2$
= $r^2(\pi - 2)$ sq. units

235. (3) Using Rule 9 and 1,



AE = FB = 6 cm.
In Δ ADE,

$DE = \sqrt{AD^2 - AE^2}$

$= \sqrt{12^2 - 6^2}$

$= \sqrt{(12+6)(12-6)}$

$= \sqrt{18 \times 6}$

$= 6\sqrt{3}$ cm

$\therefore$ Area of CDEF = 28 × $6\sqrt{3}$

= 168 $\sqrt{3}$ sq. cm.

Area of Δ ADE

$= \frac{1}{2} \times AE \times DE$

$= \frac{1}{2} \times 6 \times 6\sqrt{3}$

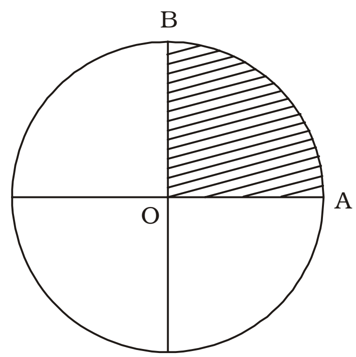
= 18 $\sqrt{3}$ sq. cm.

$\therefore$ Area of trapezium

$= \left(168\sqrt{3} + 2 \times 18\sqrt{3}\right)$ sq. cm.

= 204 $\sqrt{3}$ sq. cm.

236. (2)



If the radius of circle be r cm, then

Perimeter of quadrant OAB

$= OA + \overset{\frown}{AB} + OB$

$= r + \frac{2\pi r}{4} + r = \frac{\pi r}{2} + 2r$

$\therefore \frac{\pi r}{2} + 2r = 75$

$\Rightarrow r\left(\frac{\pi}{2} + 2\right) = 75$

$\Rightarrow r\left(\frac{22}{7 \times 2} + 2\right) = 75$

$\Rightarrow r \times \frac{50}{14} = 75$

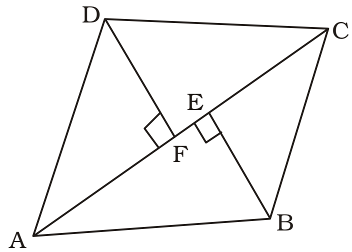
$\Rightarrow r = \frac{75 \times 14}{50} = 21$ cm

$\therefore$ Required area $= \frac{\pi r^2}{4}$

$= \left(\frac{22}{7 \times 4} \times 21 \times 21\right)$ sq.cm.

= 346.5 sq.cm.

237. (1) Using Rule 1,



AC = 24 metre

BE = 8 metre

DF = 13 metre

$\therefore$ Area of quadrilateral ABCD

= Area of ΔABC + Area of ΔACD

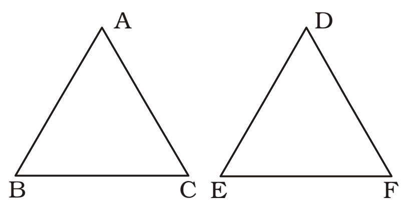
$= \frac{1}{2} \times AC \times BE + \frac{1}{2} \times AC \times DF$

$= \frac{1}{2}(24 \times 8 + 24 \times 13)$

$= \frac{1}{2} \times 24\ (8 + 13)$

$= \frac{1}{2} \times 24 \times 21 = 252$ sq.metre

238. (4)



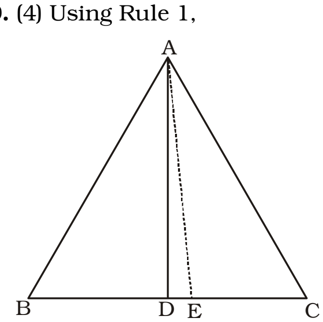
$\angle A = \angle D$

$\therefore \angle B = \angle E; \angle C = \angle F$

$\therefore$ Ratio of altitudes

$= \sqrt{\frac{9}{16}} = 3 : 4$

239. (4) Using Rule 1,



Let, AE $\perp$ BC

$\therefore \frac{\text{Area of } \Delta ABD}{\text{Area of } \Delta ADC}$

$= \frac{\frac{1}{2} \times BD \times AE}{\frac{1}{2} \times CD \times AE}$

$\Rightarrow \frac{60}{\Delta ADC} = \frac{BD}{CD}$

$\Rightarrow \frac{60}{\Delta ADC} = \frac{4}{5}$

$\Rightarrow \Delta ADC = \frac{60 \times 5}{4}$

= 75 sq. cm.

240. (2) Using Rule 14,

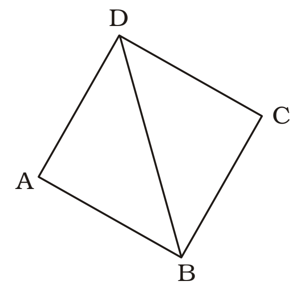
$A = \pi r^2$

$C = 2\pi r$

$\therefore \frac{A}{C} = \frac{\pi r^2}{2\pi r} = \frac{r}{2}$

$\Rightarrow rC = 2A$

241. (4)



In the rhombus ABCD,

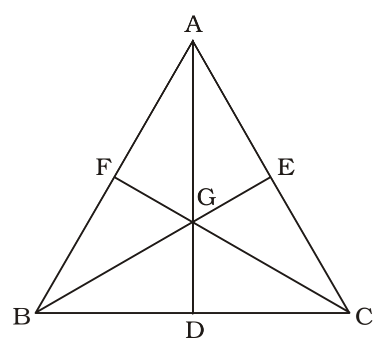
AB = AD = 12 cm.

$\angle BAD = 60°$

$\therefore \angle ABD = \angle ADB = 60°$

$\therefore$ BD = 12 cm. because ΔABD is an equilateral triangle.

242. (3) Using Rule 6,



$\angle BGC = 60°$

BG = GC

$\therefore \angle GBC = \angle GCB = 60°$

$\therefore \Delta$GBC is an equilateral triangle.

$\therefore$ Area of ΔGBC

$= \frac{\sqrt{3}}{4} \times 8^2$

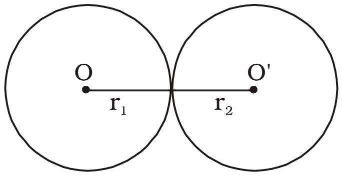
= 16 $\sqrt{3}$ sq. cm.

$\therefore$ Area of ΔABC

= 3 × 16 $\sqrt{3}$

= 48 $\sqrt{3}$ sq. cm.

243. (4) Using Rule 14,



$OO' = r_1 + r_2 = 14$ cm. --(i)

Again, $\pi r_1^2 + \pi r_2^2 = 130\pi$

$\Rightarrow r_1^2 + r_2^2 = 130$

$\Rightarrow r_1^2 + (14 - r_1)^2 = 130$

[From equation (i)]

$\Rightarrow r_1^2 + 196 - 28r_1 + r_1^2 = 130$

$\Rightarrow 2r_1^2 - 28r_1 + 196 - 130 = 0$

$\Rightarrow 2r_1^2 - 28r_1 + 66 = 0$

$\Rightarrow r_1^2 - 14r_1 + 33 = 0$

$\Rightarrow r_1^2 - 11r_1 - 3r_1 + 33 = 0$

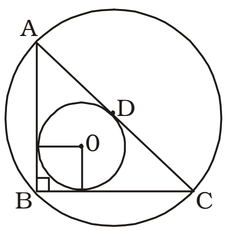
$\Rightarrow r_1(r_1 - 11) - 3(r_1 - 11) = 0$

$\Rightarrow (r_1 - 11)(r_1 - 3) = 0$

$\Rightarrow r_1 = 11$ or, 3 cm.

$\therefore r_2 = 3$ or, 11 cm.

244. (2) Using Rule 1 and 14,
It is a right angled triangle.



Radius of circum circle C_2

$= \frac{5}{2}$ cm. because

AC = Diameter of circle

Semi-perimeter of $\Delta ABC(s)$

$= \frac{3+4+5}{2} = 6$ cm.

Area of $\Delta ABC = \frac{1}{2} \times 3 \times 4$

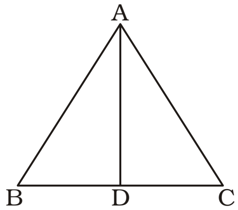
= 6 sq. cm.

$\therefore$ In-radius $= \frac{\Delta}{s} = \frac{6}{6} = 1$ cm.

$$\therefore \frac{\text{Area of } C_1}{\text{Area of } C_2} = \frac{\pi \times 1^2}{\pi \times \left(\frac{5}{2}\right)^2}$$

$$= \frac{1}{\frac{25}{4}} = \frac{4}{25}$$

245. (2) Using Rule 6,



$AD = 12\sqrt{3}$ cm.

$AB = 2x$ cm. (let)

$BD = x$ cm.

From ΔABD,

$AD = \sqrt{AB^2 - BD^2}$

$= \sqrt{(2x)^2 - x^2}$

$= \sqrt{4x^2 - x^2} = \sqrt{3x^2} = \sqrt{3}\,x$

$\therefore \sqrt{3}\,x = 12\sqrt{3}$

$\Rightarrow x = 12$ cm.

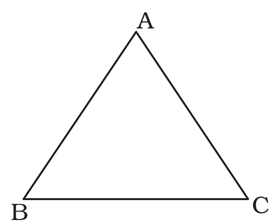
$\therefore AB = 2x = 2 \times 12 = 24$ cm.

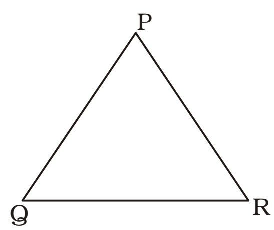
$\therefore$ Area of $\Delta ABC = \frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 24 \times 24$

$= 144\sqrt{3}$ sq. cm.

246. (1)





The ratio of the areas of two similar triangles is equal to the ratio of squares of any two corresponding sides.

$$\therefore \frac{\text{Area of } \Delta\ PQR}{\text{Area of } \Delta\ ABC} = \frac{PR^2}{AC^2}$$

$$\Rightarrow \frac{PR^2}{AC^2} = \frac{256}{441}$$

$$\Rightarrow \frac{12^2}{AC^2} = \frac{256}{441}$$

Taking square roots of both sides,

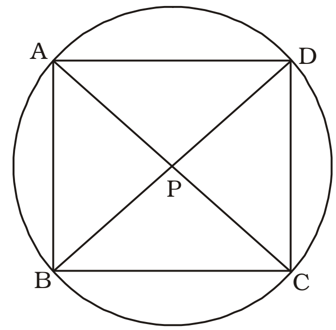
$$\frac{12}{AC} = \frac{16}{21}$$

$\Rightarrow 16 \times AC = 12 \times 21$

$$\Rightarrow AC = \frac{12 \times 21}{16} = \frac{63}{4}$$

= 15.75 cm.

247. (4)



$\angle APB = 110° = \angle CPD$

$\therefore \angle APD = 180° - 110° = 70°$

$= \angle BPC$

$\therefore \angle PCB = 180° - 70° - 30°$

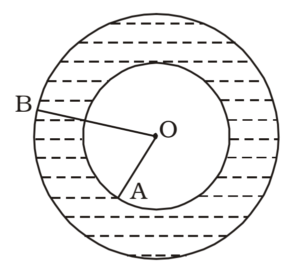
$= 80°$

Angles subtended by same arcs at the circumference are equal.

$\therefore \angle ACB$ or $\angle PCB = \angle ADB$

$= 80°$

248. (4)



Let the radius of swimming pool be r metre.

Breadth of shaded part = 4 metre

$\therefore$ OB = (r + 4) metre

According to the question,

$\pi \times OB^2 - \pi \times OA^2$

$= \frac{11}{25}\ \pi \times OA^2$

$\Rightarrow (r + 4)^2 - r^2 = \frac{11}{25}\ r^2$

$\Rightarrow r^2 + 8r + 16 - r^2 = \frac{11}{25}\ r^2$

$\Rightarrow 8r + 16 = \frac{11}{25}\ r^2$

$\Rightarrow 200r + 400 = 11r^2$

$\Rightarrow 11r^2 - 200r - 400 = 0$

$\Rightarrow 11r^2 - 220r + 20r - 400 = 0$

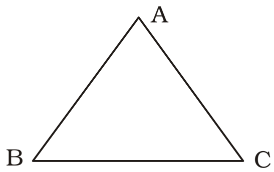
$\Rightarrow 11r(r - 20) + 20(r - 20) = 0$

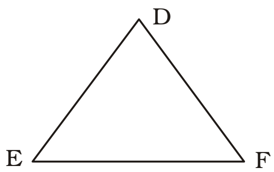
$\Rightarrow (r - 20)(11r + 20) = 0$

$\Rightarrow r = 20$ metre because

$r \neq -\frac{20}{11}$ metre

249. (2)





$\Delta ABC \sim \Delta DEF$

$\therefore \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

$= \frac{AB + BC + AC}{DE + EF + DF} = \frac{4}{1}$

$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF}$

$= \frac{AB^2}{DE^2} = \frac{16}{1} = 16 : 1$

250. (2) Area of the field with side 50 m = 50 × 50 = 2500 sq. metre

Area of the field of side 100 m

= 100 × 100

= 10000 sq. metre

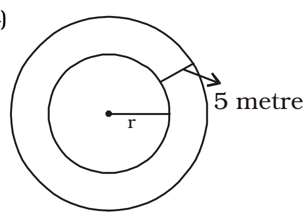
$\because$ 2500 sq. metre ≡ 750 kg.

$\therefore$ 10000 sq. metre

$\equiv \frac{750}{2500} \times 10000$ kg.

= 3000 kg.

251. (4)



More distance, more time (speed is constant)

$\therefore \frac{2\pi(r+5)}{2\pi r} = \frac{20}{19}$

$\Rightarrow \frac{r+5}{r} = \frac{20}{19}$

$\Rightarrow 20r = 19r + 95$

$\Rightarrow 20r - 19r = 95$

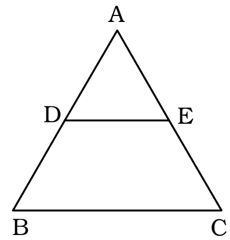
$\Rightarrow r = 95$ metre

$\therefore$ Internal diameter

= (2 × 95) metre

= 190 metre

252. (3)



$DE \parallel BC$

Area of ΔADE = Area of quadrilateral BDEC

$\Rightarrow$ Area of Δ ABC = 2 × Area of Δ ADE

In Δ ADE and Δ ABC,

$\angle D = \angle B$; $\angle E = \angle C$

$\therefore \Delta ADE \sim \Delta ABC$

$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ADE} = \frac{AB^2}{AD^2}$

$\Rightarrow \frac{AB^2}{AD^2} = 2 \Rightarrow AB = \sqrt{2}\, AD$

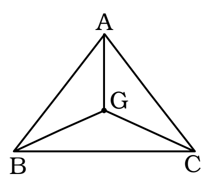
$\Rightarrow AB = \sqrt{2}\,(AB - DB)$

$\Rightarrow \sqrt{2}\, AB - AB = \sqrt{2}\, DB$

$\Rightarrow AB(\sqrt{2} - 1) = \sqrt{2}\, DB$

$\Rightarrow \frac{DB}{AB} = \frac{\sqrt{2} - 1}{\sqrt{2}}$

253. (4) Using Rule 1,



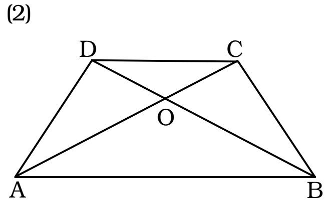
$\Delta GBC = \Delta ACG = \Delta AGB$

$\therefore$ Area of ΔGBC

$= \frac{1}{3} \times$ Area of Δ ABC

$= \frac{1}{3} \times 60 = 20$ sq.cm.

254. (2)



DC || AB

$\angle DCA = \angle CAB$

$\angle CDB = \angle DBA$

$\therefore \Delta COD \sim \Delta AOB$

$\therefore \frac{\text{Area of } \Delta COD}{\text{Area of } \Delta AOB}$

$= \frac{CD^2}{AB^2} = \frac{CD^2}{4\,CD^2} = \frac{1}{4}$

$\therefore$ Area of Δ COD

$= \frac{1}{4} \times 84$

= 21 sq. cm.

255. (2) Using Rule 1,

Area of triangle = $\frac{1}{2}$ × base × height

$= \frac{1}{2} \times b \times h$

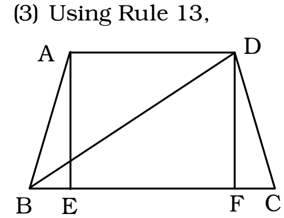
$\therefore$ According to the question,

$\frac{\frac{1}{2} \times b_1 h_1}{\frac{1}{2} b_2 h_2} = \frac{3}{2}$

$\Rightarrow \frac{b_1}{b_2} \times \frac{4}{5} = \frac{3}{2}$

$\Rightarrow \frac{b_1}{b_2} = \frac{3}{2} \times \frac{5}{4} = \frac{15}{8} = 15 : 8$

256. (3) Using Rule 13,



BC = $7x$ cm.

AD = $4x$ cm.

AB = DC ; AE ⊥ BC ; DF ⊥ BC

Area of trapezium ABCD

$= \frac{1}{2} \times (AD + BC) \times AE$

$\Rightarrow 176 = \frac{1}{2} \times 11x \times \frac{2}{11} \times 11x$

$\Rightarrow 176 = 11x^2$

$\Rightarrow x^2 = \frac{176}{11} = 16$

$\Rightarrow x = \sqrt{16} = 4$

$\therefore$ BC = 7 × 4 = 28 cm.

AD = 4 × 4 = 16 cm.

$\therefore$ BE = FC = $\frac{1}{2}$ (28 – 16) cm.

= 6 cm.

$\therefore$ BF = 16 + 6 = 22 cm.

$\therefore$ DF = $\frac{2}{11} \times 11x = 2x$

= 8 cm.

$\therefore$ Diagonal BD = $\sqrt{BF^2 + FD^2}$

$= \sqrt{22^2 + 8^2}$

$= \sqrt{484+64}$

$= \sqrt{548} = \sqrt{4 \times 137}$

$= 2\sqrt{137}$ cm.

257. (4) Using Rule 10,

Side of square $= \sqrt{4}$

= 2 units

Diagonal of square

$= 2\sqrt{2}$ units

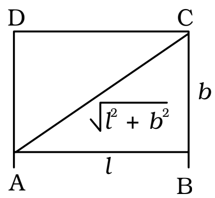
= radius of the circle

$\therefore$ Area of circle $= \pi r^2$

$= \pi \times \left(2\sqrt{2}\right)^2$

$= 8\pi$ sq. units.

258. (3) Using Rule 9,



Let the length of carpet be l metre and breadth be b metre.

$\therefore$ Diagonal $= \sqrt{l^2+b^2}$ ...(i)

According to the question,

$lb = 120$

and, $2(l + b) = 46$

$\Rightarrow l + b = 23$

On squaring both sides,

$(l + b)^2 = 23^2$

$\Rightarrow l^2 + b^2 + 2lb = 529$

$\Rightarrow l^2 + b^2 + 2 \times 120 = 529$

$\Rightarrow l^2 + b^2 = 529 - 240 = 289$

$\therefore \sqrt{l^2+b^2} = \sqrt{289}$

= 17 metre

= Diagonal of the carpet

259. (1) Volume of the plate of square base = Area of base × height

$= x^2 \times \frac{1}{10} = \frac{x^2}{10}$ cu. cm.

According to the question,

$\frac{x^2}{10} \times 8.4 = 4725$

$\Rightarrow x^2 = \frac{4725 \times 10}{8.4} = 5625$

$\Rightarrow x = \sqrt{5625} = 75$ cm.

260. (2) Using Rule 13,

Area of the trapezium

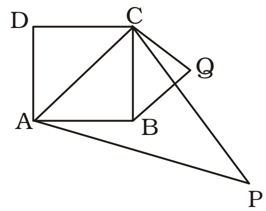
$= \frac{1}{2} \times$ (Sum of parallel sides) × height

$\Rightarrow 175 = \frac{1}{2}(15+20) \times h$

$\Rightarrow \frac{175 \times 2}{35} = h$

$\Rightarrow h = 10$ cm

261. (1)



From Δ ABC

$AC = \sqrt{AB^2 + BC^2}$

$= \sqrt{BC^2 + BC^2}$

$= \sqrt{2}$ BC

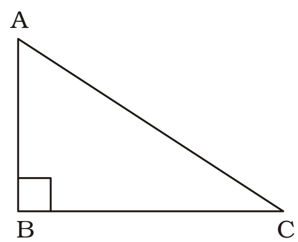
Δ QBC ~ Δ PAC

$\therefore \frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC} = \frac{BC^2}{AC^2}$

$= \frac{BC^2}{\left(\sqrt{2}BC\right)^2}$

$= \frac{BC^2}{2BC^2} = \frac{1}{2}$

262. (1)



AC = 39 cm.

BC – AB = 21 cm.

On squaring both sides,

$(BC - AB)^2 = 21^2$

$\Rightarrow BC^2 + AB^2 - 2BC.AB = 441$

$\Rightarrow AC^2 - 2BC.AB = 441$

$\Rightarrow 39^2 - 2BC.AB = 21^2$

$\Rightarrow 2.BC.AB = 39^2 - 21^2$

$\Rightarrow 2.BC.AB = (39 + 21)(39 - 21)$

$\Rightarrow 2\ BC\ .\ AB = 60 \times 18$

$\Rightarrow BC\ .\ AB = \frac{60 \times 18}{2}$

$= 60 \times 9$

$\therefore$ Area of triangle

$= \frac{1}{2}$ BC.AB

$= \frac{1}{2} \times 60 \times 9 = 270$ sq. cm.

263. (3) Distance covered by man in 8 minutes

$= \left(\frac{12 \times 1000 \times 8}{60}\right)$ metre.

= 1600 metre = Perimeter of park

Length of park = $3x$ metre (let)

Width = $2x$ metre

$\therefore 2(3x + 2x) = 1600$

$\Rightarrow 5x = \frac{1600}{2} = 800$

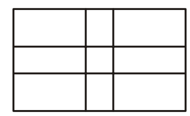
$\Rightarrow x = \frac{800}{5} = 160$

$\therefore$ Area of park $= 3x \times 2x = 6x^2$

$= 6 \times (160)^2$

= 153600 sq. metre

264. (1)



Area of rectangular park

= 60 × 40 = 2400 sq. metre

Let the width of cross-road be x metre.

$\therefore$ Area of cross-roads

$= 60x + 40x - x^2$

$= 100x - x^2$

According to the question,

$100x - x^2 = 2400 - 2109$

$\Rightarrow 100x - x^2 = 291$

$\Rightarrow x^2 - 100x + 291 = 0$

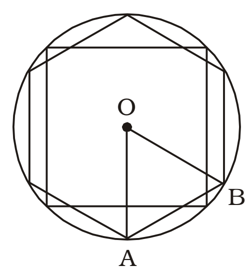
$\Rightarrow x^2 - 3x - 97x + 291 = 0$

$\Rightarrow x(x - 3) - 97(x - 3) = 0$

$\Rightarrow (x - 3)(x - 97) = 0$

$\Rightarrow x = 3$ because $x \neq 97$

265. (2)



Diagonal of square = $2r$ cm.

$\therefore$ Area of square $= \frac{1}{2} \times (2r)^2$

$= 2r^2$ sq. cm.

Area of ΔOAB $= \frac{\sqrt{3}}{4}r^2$ sq. cm.

$\therefore$ Area of hexagon $= \frac{6\sqrt{3}}{4}r^2$

$= \frac{3\sqrt{3}}{2}r^2$ sq. cm.

$\therefore$ Required ratio

$= 2r^2 : \frac{3\sqrt{3}}{2}r^2$

$= 4 : 3\sqrt{3}$

266. (2) $\Delta ABC \sim \Delta DEF$

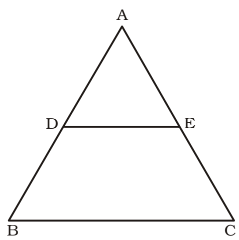
$\therefore \dfrac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \dfrac{BC^2}{EF^2}$

$\Rightarrow \dfrac{9}{16} = \dfrac{(2.1)^2}{(EF)^2}$

$\Rightarrow \dfrac{3}{4} = \dfrac{2.1}{EF}$

$\Rightarrow EF = \dfrac{4 \times 2.1}{3} = 2.8$ cm.

267. (4)



DE || BC and DE = $\dfrac{1}{2}$BC

$\therefore \dfrac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ADE} = \dfrac{BC^2}{DE^2} = 4$

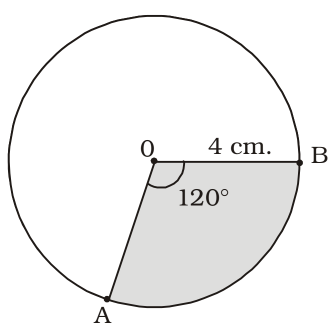
$\therefore$ Area of $\Delta ADE = \dfrac{1}{4} \times$ Area of ΔABC

Area of $\square$ BCED

$= \dfrac{3}{4} \times$ Area of ΔABC

$\therefore$ Required ratio = 1 : 3

268. (3)



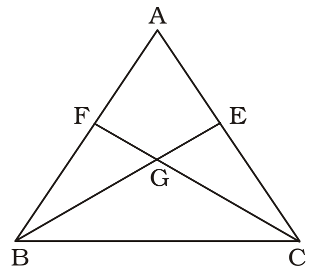
$\because 360° \equiv \pi r^2$

$\therefore 120° \equiv \dfrac{120}{360} \times \pi r^2$

$\equiv \dfrac{\pi r^2}{3} = \dfrac{22}{7 \times 3} \times 4 \times 4$

$= \dfrac{352}{21} = 16.76$ sq. cm.

269. (4)



BG = GC, $\angle BGC = 120°$

$\therefore \angle GBC = \angle GCB = 30°$

$\therefore \Delta ABC$ is an equilateral triangle.

$\therefore$ Area of Δ ABC

$= \dfrac{\sqrt{3}}{4} \times \text{Side}^2$

$= \dfrac{\sqrt{3}}{4} \times 10 \times 10$

$= 25\sqrt{3}$ Sq. cm.

270. (2) Length of room = 16 metre 5 cm.

= 1605 cm.

Width = 1500 cm.

Largest side of square tile

= HCF of 1605 cm and 1500 cm

= 15 cm.

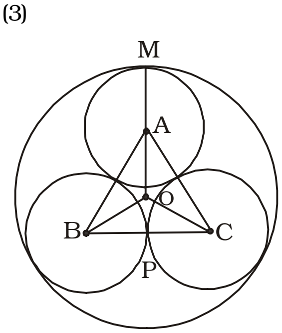
```
1500) 1605 (1
      1500
      105) 1500 (14
           105
           450
           420
            30) 105 (3
                 90
                 15) 30 (2
                     30
                     ×
```

$\therefore$ Number of tiles

$= \dfrac{1605 \times 1500}{15 \times 15}$

= 10700

271. (3)



AB = BC = AC = 2 cm.

($\because$ Radius of each circle = 1 cm.)

$\therefore AP = \dfrac{\sqrt{3}}{2} \times 2 = \sqrt{3}$ cm.

Point O is the centroid.

$OA = \dfrac{2}{3} \times \sqrt{3} = \dfrac{2}{\sqrt{3}}$

$\therefore OM = \dfrac{2}{\sqrt{3}} + 1 = \dfrac{2+\sqrt{3}}{\sqrt{3}}$ cm.

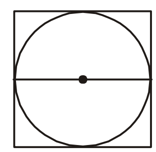
OM = radius of larger circle

$\therefore$ Required area = πR^2

$= \pi \left(\dfrac{2+\sqrt{3}}{\sqrt{3}}\right)^2$

$= \dfrac{\pi}{3} \left(2+\sqrt{3}\right)^2$

272. (1)



Diagonal of square

$= 6\sqrt{2}$ cm.

$\therefore$ Side of square $= \dfrac{6\sqrt{2}}{\sqrt{2}}$

= 6 cm.

$\therefore$ Diameter of circle = 6 cm.

Its radius = 3 cm.

$\therefore$ Area of circle = πr^2

$= \pi (3)^2$ sq. cm.

$= 9\pi$ sq. cm.

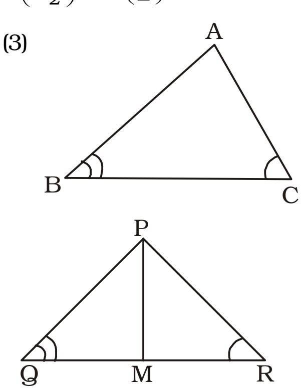
273. (2) Area of square

$= \dfrac{1}{2} \times (\text{diagonal})^2$

$\therefore$ Required ratio $= \dfrac{\frac{1}{2}(d_1)^2}{\frac{1}{2}(d_2)^2}$

$= \left(\dfrac{d_1}{d_2}\right)^2 = \left(\dfrac{5}{2}\right)^2 = \dfrac{25}{4}$

274. (3)



M is the mid point of QR.
$\therefore$ PM is the median.
$\therefore$ Δ PMQ and Δ PMR are equal in area.
$\angle B = Q$, $\angle C = \angle R$
By AA - similarity theorem,
Δ ABC ~ Δ PQR

$$\therefore \frac{\Delta ABC}{\Delta PQR} = \frac{AB^2}{PQ^2} = \left(\frac{7}{4}\right)^2$$

$$\Rightarrow \frac{\Delta ABC}{2\Delta PMR} = \frac{49}{16}$$

$$\Rightarrow \frac{\Delta ABC}{\Delta PMR} = \frac{49}{16} \times 2 = \frac{49}{8}$$

275. (2) Area of square

$$= \frac{1}{2} \times (\text{diagonal})^2$$

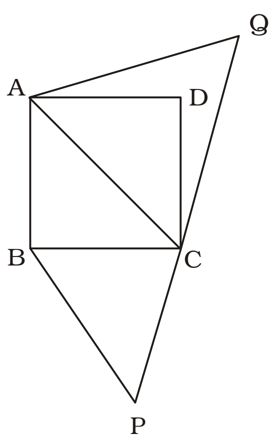
$$\therefore \text{ Required ratio} = \frac{d_1^2}{d_2^2}$$

$$= \left(\frac{3}{7}\right)^2 = \frac{9}{49} = 9 : 49$$

276. (1) Side of square $= \frac{24}{4}$ cm.
= 6 cm.
Base of triangle = 6 cm.
$\because$ $6^2 + 8^2 = 10^2$ and $6 + 8 + 10 = 24$
$\therefore$ Height of triangle = 8 cm.
$\therefore$ Area of triangle

$$= \frac{1}{2} \times 6 \times 8 = 24 \text{ sq. cm.}$$

277. (1)

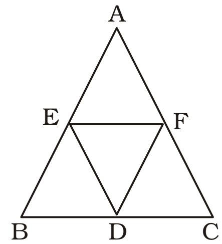


Side of square = x units
Diagonal of square
$= \sqrt{2}\,x$ units

$$\frac{\text{Area of } \Delta PBC}{\text{Area of } \Delta QAC} = \frac{\frac{\sqrt{3}}{4}x^2}{\frac{\sqrt{3}}{4}\left(\sqrt{2}x\right)^2}$$

$$= \frac{1}{2}$$

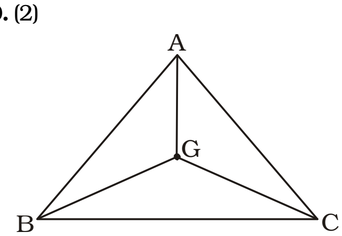
278. (4)



BD = DC = CF = AF =
AE = BE = DE = EF = DF
$\Delta BDE \cong \Delta DCF \cong \Delta AEF \cong \Delta DEF$
$\therefore$ Area of ΔDEF = Area of Δ DCF
$\therefore$ Required ratio = 1 : 1

279. (4) Let the length of rectangle be a cm and its breadth be b cm.
According to the question,
Area of rectangle
$= ab = 60$ ... (i)
and, perimeter of rectangle
$= 2(a + b)$
$\Rightarrow 2(a + b) = 34$
$= a + b = 17$
On squaring both sides,
$a^2 + b^2 + 2ab = 17^2 = 289$
$\Rightarrow a^2 + b^2 + 2 \times 60 = 289$
[From equation (i)]
$\Rightarrow$ $a^2 + b^2 = 289 - 120 = 169$
$\therefore$ Diagonal of rectangle
$= \sqrt{a^2 + b^2} = \sqrt{169}$
= 13 cm.

280. (2)

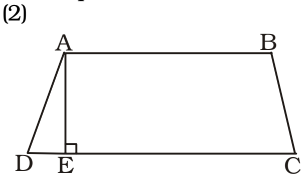


Point G is the centroid of ΔABC.
$\therefore$ Δ BGC $\cong$ Δ AGC $\cong$ AGB

$$\therefore \text{ Area of } \Delta \text{ BGC} = \frac{1}{3} \times 72$$

= 24 sq. units

281. (2)



Area of the trapezium ABCD

$$= \frac{1}{2}(AB + CD) \times AE$$

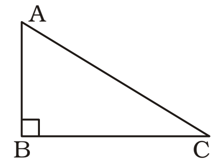
$$\Rightarrow 16 = \frac{1}{2}(AB + 6) \times 4$$

$\Rightarrow 16 = 2\,(AB + 6)$
$\Rightarrow AB + 6$

$$= \frac{16}{2} = 8$$

$\Rightarrow AB = 8 - 6 = 2$ cm.

282. (4)



AC = 10 cm.
AB = 8 cm.

$$\therefore \text{ BC} = \sqrt{AC^2 - AB^2}$$

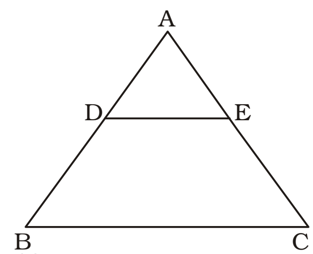
$$= \sqrt{10^2 - 8^2} = \sqrt{100 - 64}$$

$$= \sqrt{36} = 6 \text{ cm.}$$

$$\therefore \text{ Area of } \Delta ABC = \frac{1}{2} \times AB \times BC$$

$$= \frac{1}{2} \times 8 \times 6 = 24 \text{ sq. cm.}$$

283. (4)



DE || BC
$\therefore$ $\angle ADE = \angle ABC$
$\angle AED = \angle ACB$
By AA–similarity,
$\Delta ADE \sim \Delta ABC$

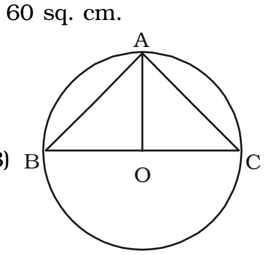
$$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ADE} = \frac{BC^2}{DE^2}$$

$$\Rightarrow \frac{\text{Area of } \Delta ABC}{15} = \frac{6^2}{3^2}$$

$$= \frac{36}{9} = 4$$

$\therefore$ Area of ΔABC = 4 × 15
= 60 sq. cm.

284. (3)



The angle in a semi–circle is a right angle.
$\therefore$ BC = 2 × 3 = 6 cm.
OA = 2 cm.
$\therefore$ Area of ΔABC

$$= \frac{1}{2} \times BC \times OA$$

$$= \frac{1}{2} \times 6 \times 2 = 6 \text{ sq. cm.}$$

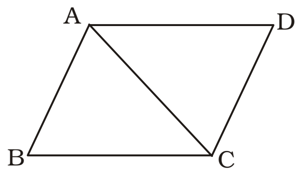
285. (4) Area of the rhombus

$= \frac{1}{2} d_1 \times d_2$

$= \left(\frac{1}{2} \times 8 \times 6\right)$ sq. cm.

= 24 sq. cm.

286. (4)



Area of parallelogram ABCD

= 2 × Area of Δ ABC

AB = 21 cm. = c

BC = 20 cm. = a

AC = 29 cm. = b

∴ Semi-perimeter of Δ ABC

$= s = \frac{a+b+c}{2}$

$= \left(\frac{20+29+21}{2}\right)$ cm.

$= \frac{70}{2} = 35$ cm.

∴ Area of Δ ABC

$= \sqrt{8(s-a)(s-b)(s-c)}$

$= \sqrt{35(35-20)(35-29)(35-21)}$

$= \sqrt{35 \times 15 \times 6 \times 14}$

$= \sqrt{7 \times 5 \times 5 \times 3 \times 2 \times 3 \times 2 \times 7}$

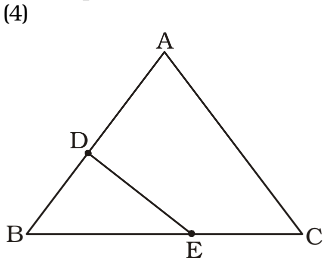
= 7 × 2 × 3 × 5 = 210 sq.cm.

∴ Area of ABCD

= (2 × 210) sq. cm.

= 420 sq. cm.

287. (4)



Let, AB = BC = CA

= $2x$ units

∴ BD = BE = x units

Area of Δ ABC

$= \frac{\sqrt{3}}{4} \times (2x)^2$

$= \sqrt{3}x^2$ sq. units

Area of Δ BDE = $\frac{\sqrt{3}}{4}x^2$

∴ Area of a trapezium ADEC

$= \left(\sqrt{3}x^2 - \frac{\sqrt{3}}{4}x^2\right)$ sq. units

$= \frac{3\sqrt{3}x^2}{4}$ sq. units

∴ Required ratio

$= s\sqrt{3x^2} : \frac{3\sqrt{3}}{4}x^2 = 4 : 3$

288. (3) Length of rectangle = l metre, its breadth = b metre

Side of square = x metre

According to the question,

$4x = 2(l + b)$

$\Rightarrow l + b = 2x$ ..... (i)

Area of square = A = x^2

Area of rectangle = B = lb

∴ $A - B = x^2 - lb$

$= \left(\frac{l+b}{2}\right)^2 - lb$

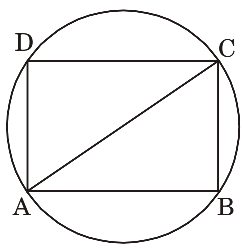
$= \frac{l^2+b^2+2lb}{4} - lb$

$= \frac{l^2+b^2+2lb-4lb}{4}$

$= \frac{(l-b)^2}{4} > 0$

$\Rightarrow$ A > B

289. (2)



Let AB = 4 cm.

Diagonal of rectangle = Diameter of cirlce = 5 cm.

In ΔABC,

$BC = \sqrt{AC^2 - AB^2}$

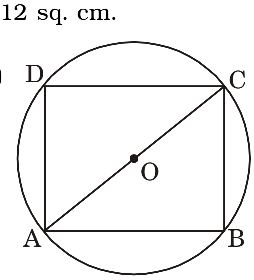
$= \sqrt{5^2 - 4^2} = \sqrt{25-16}$

$= \sqrt{9} = 3$ cm.

∴ Area of rectangle = 4 × 3

= 12 sq. cm.

290. (2)



Let AB = 4 cm.

∴ AC = Diameter of circle

= Diagonal of rectangle = 5 cm.

∴ In ΔABC

$BC = \sqrt{AC^2 - AB^2}$

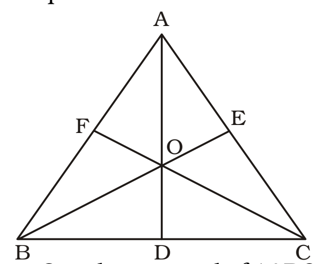
$= \sqrt{5^2 - 4^2} = \sqrt{25-16}$

$= \sqrt{9} = 3$ cm.

∴ Area of rectangle = (4 × 3) sq. cm.

= 12 sq. cm.

291. (3)



Point O is the centroid of ΔABC.

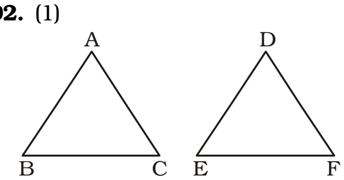
∴ ΔAOB ≡ ΔAOC ≡ ΔBOC

Again, ΔBOD ≡ ΔCOD

∴ Area of ΔBOD = $\frac{1}{6}$ × Area of ΔABC

$= \frac{1}{6} \times 96 = 16$ sq. cm.

292. (1)



ΔABC ~ ΔDEF

∴ $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{AB^2}{DE^2}$

$= \frac{k^2}{1}$ k² : 1

293. (2) Height of equilateral triangle

$= \frac{\sqrt{3}}{2} \times$ Side

$\Rightarrow 18 = \frac{\sqrt{3}}{2} \times$ Side

$\Rightarrow$ Side $= \frac{18 \times 2}{\sqrt{3}} = 12\sqrt{3}$ cm.

∴ Area of triangle = $\frac{\sqrt{3}}{4} \times \text{Side}^2$

$= \frac{\sqrt{3}}{4} \times 12\sqrt{3} \times 12\sqrt{3}$

$= 108\sqrt{3}$ sq. cm.

294. (2) Perimeter of rectangular land

$= \frac{6000}{7.5} = 800$ metre

Length = $5x$ metre

Breadth = $3x$ metre

∴ $2(5x + 3x) = 800$

$\Rightarrow 16x = 800 \Rightarrow x = \frac{800}{16} = 50$

∴ Required difference

= $5x - 3x = 2x$ metre

= (2 × 50) metre = 100 metre

295. (1) Side of square = x metre

Radius of circle = $\frac{x}{2}$ metre

$\therefore \frac{\text{Area of square}}{\text{Area of circle}} = \frac{x^2}{\pi\left(\frac{x}{2}\right)^2}$

$= \frac{x^2}{\frac{22}{7} \times \frac{x^2}{4}} = \frac{28}{22} = \frac{14}{11}$

= 14 : 11

296. (1) Side of equilateral triangle = $\frac{132}{3}$ = 44 cm.

Its area = $\left(\frac{\sqrt{3}}{4} \times 44 \times 44\right)$ sq. cm.

= $484\sqrt{3}$ sq. cm.

= 484 × 1.7 = 822.8 sq. cm.

Side of square = $\frac{132}{4}$ = 33 cm.

Area of square = 33 × 33

= 1089 sq. cm.

Circumference of circle = $2\pi r$

$\Rightarrow 2 \times \frac{22}{7} \times r = 132$

$\Rightarrow r = \frac{132 \times 7}{2 \times 22}$ = 21 cm.

$\therefore$ Area of circle

$= \frac{22}{7} \times 21 \times 21$ = 1386 sq. cm.

297. (4) The areas of triangles on the same base and between the same parallel lines are equal.

$\therefore$ ΔABC = ΔABD

298. (2) Perimeter of rhombus

= 4 × side

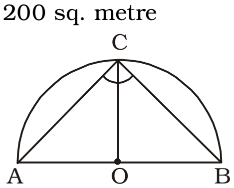
$\therefore$ Each side = $\frac{240}{4}$ = 60 metre

Distance between parallel sides = 20 metre

$\therefore$ Area of rhombus = 60 × 20

= 1200 sq. metre

299. (1)



The angle in a semi-circle is a right angle.

Let point C be the mid-point of arc ABC.

Maximum height of ΔABC

= OC = radius

$\therefore$ Area of triangle ABC

$= \frac{1}{2} \times AB \times OC$

$= \frac{1}{2} \times 12 \times 6$ = 36 sq. metre

300. (1) Area of circle = πr^2

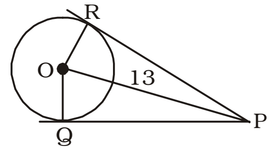
Area of square = side^2

$\therefore$ Side$^2 = \pi r^2$

$\Rightarrow \frac{\text{Side}^2}{r^2} = \pi$

$\therefore \frac{\text{Side}}{r} = \sqrt{\pi} : 1$

301. (1)



OQ ⊥ QP ; OR ⊥ PR

OR = OQ = radius

PQ = PR = Tangents from an exterior point

OP is common.

$\therefore$ ΔORP ≅ ΔOPQ

In right ΔOPQ,

OP = 13 cm., OQ = 5 cm.

$\therefore PQ = \sqrt{13^2 - 5^2} = \sqrt{169 - 25}$

$= \sqrt{144}$ = 12 cm.

Area of ΔOPQ = $\frac{1}{2}$ × 12 × 5

= 30 sq. cm.

$\therefore$ Area of quadrilateral PQOR = 2 × 30 = 60 sq. cm.

302. (3) Median of equilateral triangle

= Its height = $12\sqrt{3}$ cm.

If the side of equilateral triangle be x cm, then its height

$= \frac{\sqrt{3}}{2}x$ cm.

$\therefore \frac{\sqrt{3}}{2}x = 12\sqrt{3}$

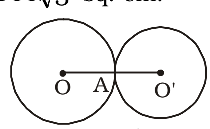
$\Rightarrow x = \frac{12\sqrt{3} \times 2}{\sqrt{3}}$ = 24 cm.

$\therefore$ Required area

$= \left(\frac{\sqrt{3}}{4} \times 24 \times 24\right)$ sq. cm.

$= 144\sqrt{3}$ sq. cm.

303. (2)



Let OA = R and O'A = r cm.

According to the question,

$\pi R^2 + \pi r^2 = 130\pi$

$\Rightarrow R^2 + r^2 = 130$ ..... (i)

Again, R + r = 14 cm.

$\Rightarrow r = (14 - R)$ cm.

$\therefore R^2 + r^2 = 130$

$\Rightarrow R^2 + (14 - R)^2 = 130$

$\Rightarrow R^2 + 196 - 28R + R^2 = 130$

$\Rightarrow 2R^2 - 28R + 196 - 130 = 0$

$\Rightarrow 2R^2 - 28R + 66 = 0$

$\Rightarrow R^2 - 14R + 33 = 0$

$\Rightarrow R^2 - 11R - 3R + 33 = 0$

$\Rightarrow R(R - 11) - 3(R - 11) = 0$

$\Rightarrow (R - 11)(R - 3) = 0$

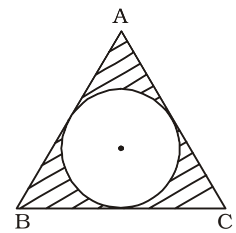
$\Rightarrow$ R = 11 or 3 cm.

$\therefore r$ = 3 or 11 cm.

$\therefore$ Radius of larger circle

= 11 cm.

304. (4)



Radius of circle = $\frac{a}{2\sqrt{3}}$

$= \frac{24}{2\sqrt{3}} = 4\sqrt{3}$ cm.

$\therefore$ Area of circle = $\pi\left(4\sqrt{3}\right)^2$

= 48π sq. cm.

$= \left(48 \times \frac{22}{7}\right)$ sq. cm.

= 150.86 sq. cm.

Area of ΔABC

$= \left(\frac{\sqrt{3}}{4} \times 24 \times 24\right)$ sq. cm.

= 144 × 1.732

= 249.408 sq. cm.

$\therefore$ Area of the shaded region

= (249.408 – 150.86) sq. cm.

= 98.548 sq. cm.

305. (2) In-radius

$= \frac{\text{Area}}{\text{Semi} - \text{perimeter}}$

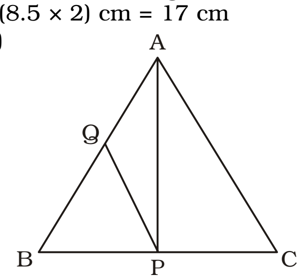
$\Rightarrow 4 = \frac{34}{\text{Semi} - \text{perimeter}}$

$\Rightarrow$ Semi-perimeter = $\frac{34}{4}$ = 8.5

$\therefore$ Perimeter of triangle

= (8.5 × 2) cm = 17 cm

306. (4)



AP is the median at BC.

$\therefore$ Area of ΔABP = Area of ΔAPC

Again, 2AQ = QB

$\therefore$ Area of ΔAPQ

$= \frac{1}{3}$ Area of ΔABP

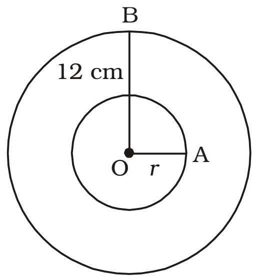
$\therefore$ Area of ΔAPQ

$= \frac{1}{6}$ Area of ΔABC

$= \left(\frac{1}{6} \times 10.8\right)$ sq.cm

= 1.8 sq.cm.

307. (3)



According to the question,

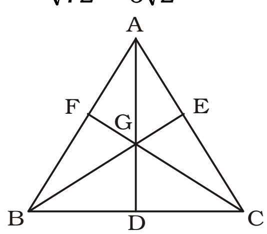
$\pi \times 12^2 = 2\pi r^2$

$\Rightarrow 2r^2 = 12 \times 12$

$\Rightarrow r^2 = \frac{12 \times 12}{2} = 72$

$\Rightarrow r = \sqrt{72} = 6\sqrt{2}$ cm.

308. (1)



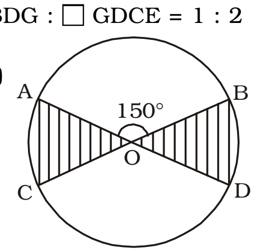
Area of ΔABD = Area of ΔADC = Area of ΔBCE

Clearly,

Area of ΔBDG = Area of ΔCGD = Area of ΔCEG

$\Delta BDG : \square GDCE = 1 : 2$

309. (3)



$\angle AOC = \angle BOD = 180° - 150° = 30°$

$\therefore$ Area of region x

$= \frac{60}{360} \times \pi r^2$

$= \frac{1}{6}\pi r^2$ sq. units.

310. (1) $w = \pi y^2$ = Area of larger circle

$w' = \pi y^2 - \pi x^2$

$\Rightarrow w' = w - \pi x^2$

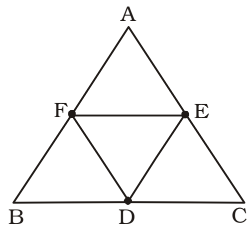
$\Rightarrow \pi x^2 = w - w'$

$\therefore \frac{\pi x^2}{\pi y^2} = \frac{w - w'}{w}$

$\Rightarrow \frac{x^2}{y^2} = 1 - \frac{w'}{w}$

$\Rightarrow \frac{x}{y} = \sqrt{1 - \frac{w'}{w}}$

311. (2)



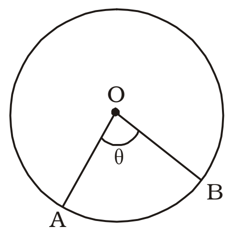
EF || CB and FE $= \frac{1}{2}$BC

$\Delta DFE \sim \Delta ABC$

$\therefore \frac{\text{Area of } \Delta DEF}{\text{Area of } \Delta ABC} = \frac{EF^2}{BC^2}$

$= \frac{EF^2}{4EF^2} = \frac{1}{4}$

312. (2)



Let the length of arc AB be y units and radius of circle be r units.

$\angle AOB = x$ radians

$\therefore \theta = \frac{l}{r}$

$\Rightarrow x = \frac{y}{r}$ ....(i)

Again area of sector AOB

$= \frac{\theta}{2\pi} \times \pi r^2 = \frac{x}{2} r^2$ sq. units

According to the question,

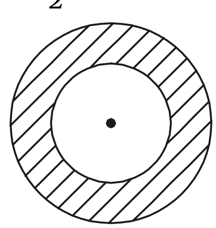
$\frac{xr^2}{2} = y^2 = (xr)^2$

[From equation (i)]

$\Rightarrow \frac{xr^2}{2} = x^2 r^2$

$\Rightarrow x = \frac{1}{2}$

312. (1)



R_1 = 68 cm.

R_2 = 22 cm.

Area of the shaded region

$= \pi\left(R_1^2 - R_2^2\right)$

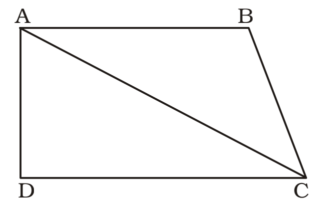
$= \pi (R_1 + R_2)(R_1 - R_2)$

$= \pi (68 + 22)(68 - 22)$

$= \pi \times 90 \times 46$

$= 4140\pi$ sq. cm.

314. (3)



$\angle ADC = 90°$

AC = 41 cm.

CD = 40 cm.

$\therefore$ AD $= \sqrt{AC^2 - CD^2}$

$= \sqrt{41^2 - 40^2}$

$= \sqrt{(41+40)(41-40)}$

$= \sqrt{81} = 9$ cm.

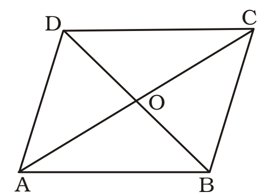
$\therefore$ Area of trapezium ABCD

$= \frac{1}{2}$ (AB + CD) × AD

$= \frac{1}{2}$ (15 + 40) × 9

$= \frac{1}{2} \times 55 \times 9 = 247.5$ sq. cm.

315. (2)



The diagonals of a rhombus bisect each other at right angles.

Let, AB = 10 cm.

AC = 12 cm.

$\therefore$ OA = OC = 6 cm.

$\angle AOB = 90°$

$\therefore$ OB $= \sqrt{AB^2 - OA^2}$

$= \sqrt{10^2 - 6^2} = \sqrt{100 - 36}$

$= \sqrt{64} = 8$ cm.

$\therefore$ BD = 2 × OB = 16 cm.

$\therefore$ Area of rhombus $= \frac{1}{2} d_1 d_2$

$= \frac{1}{2} \times 12 \times 16 = 96$ sq. cm.

316. (3) Area of circular field

$= \frac{\text{Total Expenditure}}{\text{Rate per square metre}}$

$= \left(\frac{7700}{\frac{1}{2}}\right)$ sq. metre

= (7700 × 2) sq. metre
= 15400 sq. metre
If radius of field = r metre then,
$\pi r^2 = 15400$

$\Rightarrow \frac{22}{7} r^2 = 15400$

$\Rightarrow r^2 = \frac{15400 \times 7}{22} = 7 \times 700$

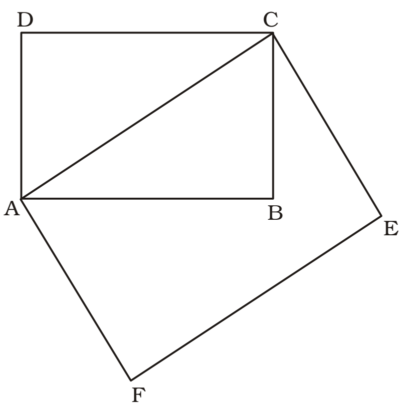
$\therefore\ r = \sqrt{7 \times 7 \times 100} = 70$ metre

$\therefore$ Circumference of circular field
$= 2\pi r$ metre

$= 2 \times \frac{22}{7} \times 70 = 440$ metre

$\therefore$ Total expenditure fencing
= Rs. (440 × 1.2)
= Rs. 528

317. (1)



Let, AB = a cm.
BC = b cm.
According to the question,
$a + b = 6$ ..... (i)
and diagonal of rectangle
$= \sqrt{a^2 + b^2}$ = side of square

$\therefore \frac{\text{Area of square}}{\text{Area of rectangle}}$

$= \frac{\left(\sqrt{a^2+b^2}\right)^2}{ab}$

$\Rightarrow \frac{5}{2} = \frac{a^2+b^2}{ab}$

$\Rightarrow \frac{5}{4} = \frac{a^2+b^2}{2ab}$

$\Rightarrow \frac{5+4}{5-4} = \frac{a^2+b^2+2ab}{a^2+b^2-2ab}$

[By componendo and dividendo]

$\Rightarrow \frac{9}{1} = \frac{(a+b)^2}{(a-b)^2}$

$\Rightarrow \frac{9}{1} = \frac{6 \times 6}{(a-b)^2}$

$\Rightarrow (a-b)^2 = \frac{6 \times 6}{9} = 4$

$\Rightarrow a - b = 2$ ..... (ii)

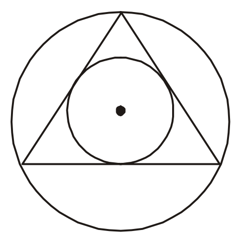
$\therefore$ Area of square $= a^2 + b^2$

$= \frac{1}{2}\left[(a+b)^2 + (a-b)^2\right]$

$= \frac{1}{2}(36 + 4)$

$= \frac{1}{2} \times 40 = 20$ sq. cm.

318. (2)



Radius of in circle $= \frac{a}{2\sqrt{3}}$ cm.

Radius of circum-circle

$= \frac{a}{\sqrt{3}}$ cm.

Where a = side of triangle
$\therefore$ Required area = Area of circum-circle – area of in–circle

$= \pi\left(\left(\frac{a}{\sqrt{3}}\right)^2 - \left(\frac{a}{2\sqrt{3}}\right)^2\right)$

$= \pi\left(\frac{a^2}{3} - \frac{a^2}{12}\right)$

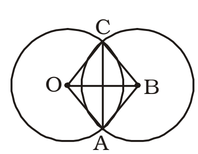
$= \pi\left(\frac{4a^2 - a^2}{12}\right)$

$= \frac{3a^2\pi}{12} = \frac{\pi a^2}{4}$

$= \frac{22}{7} \times \frac{8 \times 8}{4}$

$= \frac{352}{7} = 50\frac{2}{7}$ sq. cm.

319. (2)



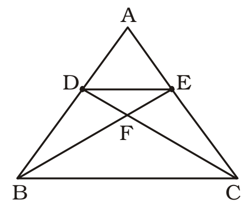
Distance between centres = diagonal of square $= \sqrt{2}$ cm.

$\therefore$ Ex radii $= \frac{1}{\sqrt{2}}$ cm.

Required area = Area of ex-circle – area of square

$= \frac{\pi}{2} - 1$

320. (2)



DE || BC
$\angle ADE = \angle ABC$
$\angle AED = \angle ACB$
By AA–similarity.
$\Delta ABC \sim \Delta ADE$

$\therefore \frac{AD}{AB} = \frac{DE}{BC}$

$\therefore \frac{AD}{DB} = \frac{4}{5}$

$\Rightarrow \frac{DB}{AD} = \frac{5}{4}$

$\Rightarrow \frac{DB + AD}{AD} = \frac{5+4}{4}$

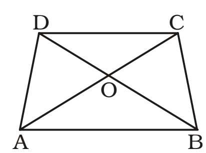
$\Rightarrow \frac{AB}{AD} = \frac{9}{4} = \frac{BC}{DE}$

$\Delta DEF \sim \Delta CBF$

$\therefore \frac{\text{Area of } \Delta DEF}{\text{Area of } \Delta CBF} = \frac{DE^2}{BC^2}$

$= \frac{16}{81} = 16 : 81$

321. (1)



In ΔCOD and ΔAOB,
$\angle OAB = \angle OCD$
$\angle OBA = \angle ODC$
By AA–similarity,
$\Delta AOB \sim \Delta COD$

$\therefore \frac{\text{Area of } \Delta AOB}{\text{Area of } \Delta COD} = \frac{AB^2}{CD^2}$

$= \frac{4CD^2}{CD^2} = \frac{4}{1} = 4 : 1$

TYPE-II

1. (2) Side of square, whose perimeter is 24 cm $= \frac{24}{4} = 6$ cm

So, Area of the square = 6^2
= 36 cm^2

Again, side of square, whose perimeter is 32cm $= \frac{32}{4} = 8$ cm

So, Area of this square = 8^2
= 64 cm^2

According to the question
Area of new square
= 64 + 36 = 100cm^2
∴ Side of the new square
$= \sqrt{100} = 10$ cm

Hence, Perimeter of new square
= 10 × 4 = 40 cm

2. (1) Side of one square $= \frac{40}{4} = 10$ cm.

[∵Perimeter = 4 × side]

Side of other square $= \frac{32}{4}$
= 8 cm.

According to the question,
Area of third square
= $(10)^2 - (8)^2$ = 100 – 64
= 36 sq.cm.

Side of third square $= \sqrt{36} = 6$ cm.
Its perimeter = 4 × 6 = 24 cm.

3. (3) Ratio of area $= \frac{225}{256}$

⇒ Ratio of side
$= \sqrt{\frac{225}{256}} = \frac{15}{16}$

∴ Ratio of perimeter
$= \frac{4 \times 15}{4 \times 16} = \frac{15}{16} \Rightarrow 15 : 16$

4. (2) Side of the first square
$= \frac{40}{4} = 10$ cm

Side of the second square
$= \frac{24}{4} = 6$ cm

Difference of the area of these squares
= (10 × 10 – 6 × 6) cm^2
= (100 – 36) cm^2
= 64 cm^2

∴ Area of the third square
= 64 cm^2
⇒ Side of third square
$= \sqrt{64} = 8$ cm

∴ Perimeter of this square
= (4 × 8) cm = 32 cm

5. (2) Using Rule 9,
Let length be 3x and breadth be 2x
∴ Perimeter = 2 (length + breadth)
= 2(3x + 2x) = 10x
According to question,
10x = 80m
⇒ x = 8m
∴ Breadth = 2x = 2× 8 = 16 m

6. (3) Using Rule 9,
Area of rectangle = $l \times b$
∴ 5x × 4x = 500 sq.m.
or, $20x^2$ = 500 sq.m.

$\Rightarrow x^2 = \frac{500}{20} = 25$

⇒ x = 5
∴ l = 5 × 5 = 25 m
b = 5 × 4 = 20 m
∴ Perimeter = 2 $(l + b)$m
= 2 (25 + 20) = 2 × 45 = 90 m

7. (2) Using Rule 9,
Let the length = l m and breadth = b m.
∴ $2 (l + b) = 28$
$\Rightarrow l + b = 14$ ... (*i*)
$l b = 48$ ....(*ii*)
Now, $(l - b)^2 = (l + b)^2 - 4lb$
$= (14)^2 - 4 \times 48$ [From (i) & (ii)]
= 196 – 192 = 4
$\Rightarrow l - b = 2$ ....(*iii*)
∴ $l = 8, b = 6$

∴ Diagonal $= \sqrt{8^2 + 6^2} = 10$ m.

8. (4) Using Rule 9,
Let the length of the rectangle be x units and breadth be y units.
∴Perimeter of rectangle
= 2 $(x + y)$ cm
According to the question,

$$\frac{x}{2x + 2y} = \frac{5}{16}$$

$$\Rightarrow \frac{x}{x + y} = \frac{5}{8}$$

$$\Rightarrow \frac{x + y}{x} = \frac{8}{5}$$

$$\Rightarrow \frac{x}{x} + \frac{y}{x} = \frac{8}{5} \Rightarrow \frac{y}{x} = \frac{8}{5} - 1$$

$$\Rightarrow \frac{y}{x} = \frac{3}{5} \Rightarrow x : y = 5 : 3$$

9. (3) $\frac{l}{2(l + b)} = \frac{5}{18} \Rightarrow \frac{l}{l + b} = \frac{5}{9}$

$$\Rightarrow \frac{l + b}{l} = \frac{9}{5} \Rightarrow \frac{l + b}{l} - 1 = \frac{9}{5} - 1$$

$$\Rightarrow \frac{b}{l} = \frac{4}{5}$$

$\Rightarrow l : b = 5 : 4$

10. (1) $x^2 + 7x + 10$
$= x^2 + 5x + 2x + 10$
$= x(x + 5) + 2(x + 5)$
$= (x + 2)(x + 5)$
∴ Possible perimeter
$= 2 (x + 2 + x + 5)$
$= 2 (2x + 7) = (4x + 14)$ cm

11. (4) Using Rule 9,
If the length and breadth of the plot be x and y respectively, then
$2(x + y) = 48$
$\Rightarrow x + y = 24$ .....(i)
$xy = 108$ .....(ii)
∴ $(x - y)^2 = (x + y)^2 - 4xy$
$= (24)^2 - 4 \times 108$
= 576 – 432 = 144
∴ $x - y = 12$ .....(iii)
From equations (i) and (iii),
x = 18 metre and y = 6 metre

12. (3) According to question,
Ratio of sides of triangle

$$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$$

Now, 6x + 4x + 3x = 52 cm.
13x = 52
∴ x = 4cm
∴ Length of smallest side = 3x = 4 × 3 = 12cm

13. (1) Using Rule 6,
Area of equilateral triangle

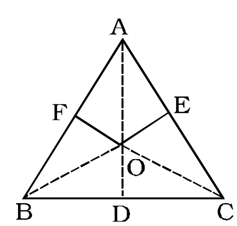
$$= \frac{\sqrt{3}}{4} \times (\text{side})^2$$

$$\Rightarrow \frac{\sqrt{3}}{4} \times (\text{side})^2 = 400\sqrt{3}$$

$$\Rightarrow (\text{Side})^2 = \frac{400\sqrt{3} \times 4}{\sqrt{3}}$$

⇒ Side $= \sqrt{4 \times 400}$ = 40 metres
∴ Perimeter = 3 × side
= 3 × 40 = 120 metres

14. (3) Using Rule 1,



Let ABC be an equilateral triangle of side x cm.

Also, Let OD $= \sqrt{3}$ cm,

OE $= 2\sqrt{3}$ cm and OF $= 5\sqrt{3}$ cm.

From the figure,

ar. DBOC + ar. DAOC + ar. DAOB = ar. DABC

or, $\frac{1}{2} \times x \times \sqrt{3} + \frac{1}{2} \times x \times 2\sqrt{3} + \frac{1}{2} \times x \times 5\sqrt{3}$

$= \frac{\sqrt{3}}{4} x^2$

or, $2\sqrt{3} + 4\sqrt{3} + 10\sqrt{3} = \sqrt{3}x$

or, $x = 2 + 4 + 10 = 16$

$\therefore$ Perimeter of the triangle $= 3x$

$= 3 \times 16 = 48$ cm

15. (3) Using Rule 1,

The perimeter of a triangle = 30 cm.

Area = 30 cm^2

We know that, $5^2 + 12^2 = 13^2$

$\therefore$ The triangle is right angled.

Now, Area $= \frac{1}{2} \times 5 \times 12 = 30 \text{cm}^2$

And, Perimeter = 5 + 12 + 13 = 30

Hence, the smallest side = 5 cm

16. (4) Using Rule 1,

Let the sides be $3x$, $4x$ and $5x$ respectively.

Here, $(3x)^2 + (4x)^2 = (5x)^2$

Hence, the triangle is right angled.

$\therefore \frac{1}{2} \times 3x \times 4x = 216$

$\Rightarrow 6x^2 = 216 \Rightarrow x^2$

$= \frac{216}{6} = 36$

$\therefore x = \sqrt{36} = 6$

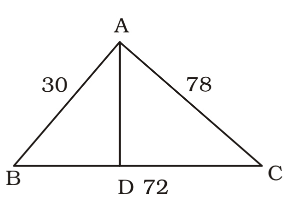
Perimeter of triangle

$= (3x + 4x + 5x)$ cm

$= 12x$ cm

$= 12 \times 6 = 72$ cm

17. (3) Using Rule 1,



Semi-perimeter,

$S = \frac{30+72+78}{2} = 90$

Area of triangle ABC

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{90(90-30)(90-72)(90-78)}$

$= \sqrt{90 \times 60 \times 18 \times 12}$

$= 1080$ m^2

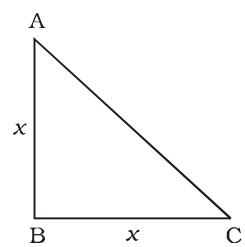
If the altitude AD be h metre, then,

$\frac{1}{2} \times \text{base} \times \text{height} = 1080$

$\Rightarrow \frac{1}{2} \times 72 \times h = 1080$

$\Rightarrow h = \frac{1080}{36} = 30$ metre

18. (1) Using Rule 1,



Let ABC be a right-angled isosceles triangle where AB = BC = x and $\angle B = 90°$.

$\therefore$ AC $= \sqrt{x^2 + x^2} = \sqrt{2}x$

$\therefore$ Perimeter of the triangle ABC

$= 4\sqrt{2} + 4$

$\Rightarrow x + x + \sqrt{2}x = 4\sqrt{2} + 4$

$\Rightarrow 2x + \sqrt{2}x = 4\sqrt{2} + 4$

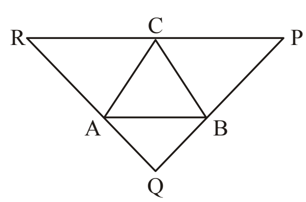
$\Rightarrow 2x + \sqrt{2}x = 2.2\sqrt{2} + \sqrt{2}.2\sqrt{2}$

$\Rightarrow x = 2\sqrt{2}$

$\therefore$ Length of the hypotenuse

$= \sqrt{2}.x = \sqrt{2}.2\sqrt{2} = 4$ cm.

19. (3)



AQ || CB ,and AC || QB

$\therefore$ AQBC is a parallelogram

$\Rightarrow$ BC = AQ

Again, AR || BC and AB || RC

$\therefore$ ARCB ,is a parallelogram.

$\Rightarrow$ BC = AR

$\Rightarrow$ AQ = AR

$\Rightarrow$ AQ = AR $= \frac{1}{2}$QR

$\Rightarrow$ BC $= \frac{1}{2}$QR

Similarly, AB $= \frac{1}{2}$PR and

AC $= \frac{1}{2}$PQ

$\therefore$ Required ratio

= (PQ + QR + RP) : (AB + BC + CA)

= 2 : 1

20. (3) $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$

or $\frac{1}{3} \times 60 : \frac{1}{4} \times 60 : \frac{1}{5} \times 60$

or 20 : 15 : 12

$\therefore 20x + 15x + 12x = 94$

[As per question]

$\Rightarrow 47x = 94 \Rightarrow x = \frac{94}{47} = 2$

$\therefore$ The smallest side $= 12x$

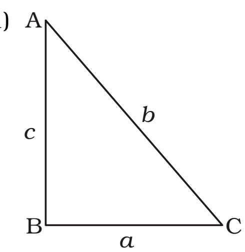
$= 12 \times 2 = 24$ cm

21. (1) Perimeter of isosceles triangle

= 15 + 15 + 22 or 15 + 22 + 22

= 52 or 59 units

22. (1)



$a + b + c = 56$ ...(i)

$\frac{1}{2}ac = 84$

$\Rightarrow ac = 168$ sq.cm.

$\therefore b^2 = a^2 + c^2$

$\Rightarrow b^2 = (a + c)^2 - 2ac$

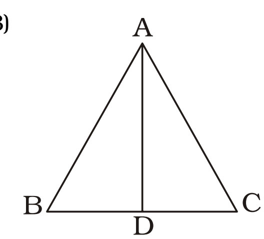
$\Rightarrow b^2 = (56 - b)^2 - 2 \times 168$ [By (i)]

$\Rightarrow b^2 = 3136 - 112b + b^2 - 336$

$\Rightarrow 112b = 2800$

$\Rightarrow b = \frac{2800}{112} = 25$ cm

23. (3)



If AB = x cm, then

BD = $\frac{x}{2}$ cm

$\therefore$ From Δ ABD
$AB^2 = BD^2 + AD^2$

$\Rightarrow x^2 = \frac{x^2}{4} + \left(6\sqrt{3}\right)^2$

$\Rightarrow x^2 - \frac{x^2}{4} = 36 \times 3$

$\Rightarrow \frac{3x^2}{4} = 36 \times 3$

$\Rightarrow x^2 = 36 \times 4$
$\Rightarrow x = 6 \times 2 = 12$ cm
$\therefore$ Perimeter of equilateral triangle
= 3 × 12 = 36 cm

24. (1) Using Rule 6,

$\frac{\sqrt{3}}{4}x^2 = 4\sqrt{3}$

$\Rightarrow x^2 = 4 \times 4 \Rightarrow x = 4$ cm
$\therefore$ Perimeter of equilateral triangle
= 3 × 4 = 12 cm

25. (4) Ratio of the sides of triangle

$= \frac{1}{4} : \frac{1}{6} : \frac{1}{8}$

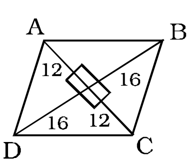
$= \frac{1}{4} \times 24 : \frac{1}{6} \times 24 : \frac{1}{8} \times 24$

[LCM of 4, 6, 8 = 24]
= 6 : 4 : 3
$\therefore 6x + 4x + 3x = 91$
$\Rightarrow 13x = 91$

$\Rightarrow x = \frac{91}{13} = 7$

$\therefore$ Required difference
$= 6x - 3x = 3x$
= 3 × 7 = 21 cm

26. (1) Using Rule 12,
We know that rhombus is parallelogram whose all four sides are equal and its diagonals bisect each other at 90°.



$\therefore AB = \sqrt{(16)^2 + (12)^2}$

$= \sqrt{256 + 144} = \sqrt{400}$
= 20 cm = side of the rhombus
$\therefore$ Perimeter of the rhombus
= 20 × 4 = 80 cm

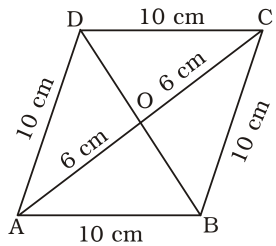
27. (4) Using Rule 12,
If d_1 and d_2 are the lengths of diagonals of a rhombus. Then

Perimeter $= 2\sqrt{d_1^2 + d_2^2}$

$= 2\sqrt{24^2 + 10^2}$
$= 2\sqrt{576 + 100} = 2\sqrt{676}$
= 2 × 26 = 52 cm

28. (3) Using Rule 12,
4 × side = 40 cm [given]

$\Rightarrow$ Side $= \frac{40}{4} = 10$ cm.



In Δ AOB,

OB = $\sqrt{(10)^2 - (6)^2}$

$= \sqrt{100 - 36} = \sqrt{64} = 8$ cm
$\therefore$ Diagonal BD = 8 × 2
= 16 cm

29. (3) Using Rule 12,
If d_1 and d_2 be the diagonals of a rhombus, we have
Perimeter = 4 × side

$= 2\sqrt{d_1^2 + d_2^2}$

$\left[\because \text{Side} = \frac{1}{2}\sqrt{d_1^2 + d_2^2}\right]$

$\Rightarrow 40 = 2\sqrt{12^2 + d_2^2}$

$\Rightarrow 20 = \sqrt{144 + d_2^2}$

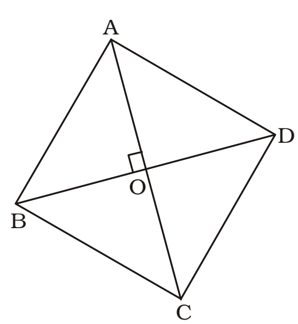
$\Rightarrow 144 + d_2^2 = 20^2 = 400$

$\Rightarrow d_2^2 = 400 - 144 = 256$

$\Rightarrow d_2 = \sqrt{256} = 16$ cm.

30. (1) $3x + 4x + 5x + 6x = 72$
$\Rightarrow 18x = 72$
$\Rightarrow x = 4$
$\therefore$ Largest side = $6x = 6 \times 4$
= 24 cm.

31. (2) Using Rule 12,



Area of rhombus = $\frac{1}{2} d_1 d_2$

$\Rightarrow 216 = \frac{1}{2} \times 24 \times d_2$

$\Rightarrow d_2 = \frac{216}{12} = 18$ cm

$\therefore$ AO = 12 cm, BO = 9 cm

$\Rightarrow AB = \sqrt{12^2 + 9^2} = \sqrt{144 + 81}$

$= \sqrt{225} = 15$ cm
$\therefore$ Perimeter of rhombus
= 4 × 15 = 60 cm

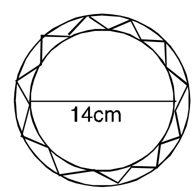
32. (1) Using Rule 14,
We know that
Area of circle = πr^2
According to question,
$\pi r^2 = 38.5$

$\Rightarrow r^2 = \frac{38.5}{22} \times 7 = (3.5)^2$

$\Rightarrow r = 3.5$ cm
$\therefore$ Circumference of circle

$= 2\pi r = 2 \times \frac{22}{7} \times 3.5 = 22$cm

33. (2) Using Rule 7,

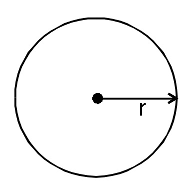


Circumference of wheel = πD

$= \frac{22}{7} \times 14 = 44$ cm.

$\therefore$ Total distance travelled by wheel in 15 revolutions
= 15 × 44 cm = 660 cm

34. (3) Using Rule 7,



Circumference = $2\pi r$

$= \frac{44}{7} \times r$ metre

Distance covered in 8 times
= $16\pi r$ metres

$\therefore$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{16\pi r}{40}$ m / minute

$= \frac{2\pi r}{5}$ m/minute

New circumference

$= 2\pi r \times 10 = 20\ \pi r$

$\therefore$ Required time

$= \frac{20\pi r}{2\pi r} \times 5$ minute $= 50$ minutes

35. (2) Using Rule 7,

Diameter of the wheel = 3 metres

$\therefore$ Circumference = $\pi \times$ diameter

$= \frac{22}{7} \times 3 = \frac{66}{7}$ metres

Since a wheel covers a distance equal to its circumference in one revolution, therefore, distance covered in 28 revolutions

$= 28 \times \frac{66}{7}$

= 264 metres

Now, 264 metres distance is covered in 1 minute

$\therefore$ 5280 metres distance will be covered in $= \frac{5280}{264}$

= 20 minutes.

36. (2) Using Rule 7,

The distance covered

= 2 km 26 decameters

$= (2 \times 1000 + 26 \times 10)$ m.

= 2260 m.

The distance covered in one revolution

$= \frac{\text{Total distance}}{\text{Number of revolutions}}$

$= \frac{2260}{113} = 20$ m.

Clearly,

Circumference of wheel

= distance covered in 1 revolution

= 20 m

$\pi \times$ diameter = 20 m.

Diameter $= \frac{20}{\pi} = \frac{20 \times 7}{22}$

$= \frac{70}{11} = 6\frac{4}{11}$ m.

37. (1) Using Rule 7,

Distance covered in 1 revolution

= Circumference of wheel

$= 2 \times \frac{22}{7} \times 1.75$ m

$\therefore$ Number of revolutions

$= \frac{11 \times 1000}{2 \times \frac{22}{7} \times 1.75}$

$= \frac{11 \times 7 \times 1000}{2 \times 22 \times 1.75} = 1000$

38. (1) Using Rule 7,

Circumference of the circular wire $= 2\pi r$

$= 2 \times \frac{22}{7} \times 42 = 264$ cm

$\Rightarrow$ Perimeter of rectangle = 264 cm

Let the sides of rectangle be $6x$ and $5x$ cm.

$\therefore 2(6x + 5x) = 264$

$\Rightarrow 2 \times 11x = 264$

$\Rightarrow x = \frac{264}{22} = 12$

$\therefore$ The smaller side

$= 5x = 5 \times 12 = 60$ cm.

39. (1) Using Rule 7,

Distance covered in 1 revolution

= Circumference of wheel

$= 2\pi r = 2 \times \frac{22}{7} \times 20$ cm.

Total distance = 176 m

= 17600 cm

$\therefore$ Number of revolutions

$= \frac{17600}{2 \times \frac{22}{7} \times 20}$

$= \frac{17600 \times 7}{2 \times 22 \times 20} = 140$

40. (2) Using Rule 14,

Let the radius of the circle be r cm.

Then, $2\pi r - 2r = 30$

$2r(\pi - 1) = 30$

$\Rightarrow 2r \times \frac{22-7}{7} = 30$

$\Rightarrow 2r \times 15 = 30 \times 7 \Rightarrow r = \frac{30 \times 7}{30}$

$\Rightarrow r = 7$ cm

41. (4) Using Rule 14,

If the radius be r metre, then

$\pi r + 2r = 144$

$\Rightarrow r(\pi + 2) = 144$

$\Rightarrow r = \frac{144}{\pi + 2} = \frac{144}{\frac{22}{7} + 2}$

$= \frac{144 \times 7}{36} = 28$

$\therefore$ Diameter $= 2r = 2 \times 28$

= 56 metre

42. (3) Using Rule 14,

Let the radius of the semi – circle be r metre.

According to the question,

$\pi r + 2r = \pi r^2$

$= \pi + 2 = \frac{\pi r^2}{2}$

$\Rightarrow 2\pi + 4 = \pi r$

$r = \frac{2\pi + 4}{\pi} = 2 + \frac{4}{\pi} = 2 + \frac{28}{22}$

$= 2 + \frac{14}{11} = \frac{36}{11}$

$\therefore$ Diameter

$= \frac{2 \times 36}{11} = \frac{72}{11} = 6\frac{6}{11}$ metres

43. (2) Using Rule 14,

Circumference of circle $= 2\pi r$

$= 2\pi \times 3 = 6\pi$ cm

Area of circle $= \pi r^2 = \pi \times 3 \times 3$

$= 9\pi\ \text{cm}^2$

$\therefore$ Required ratio $= 6\pi : 9\pi$

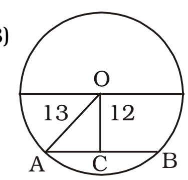
$= 2 : 3$

44. (2) Tricky Approach

Ratio of the circumference

= Ratio of radii = 3 : 4

45. (3)



$AC = \sqrt{13^2 - 12^2} = \sqrt{169 - 144}$

$= \sqrt{25} = 5$ cm

$\therefore$ AB = 10 cm

46. (1) Using Rule 7,

Distance covered by wheel in one revolution = circumference of the wheel

$= \pi \times$ diameter $= \frac{22}{7} \times 98$

= 308 cm

$\therefore$ Number of revolutions

$= \frac{1540 \times 100}{308} = 500$

47. (2) Using Rule 7,

Distance covered by wheel in one revolution

= Circumference of wheel

$\therefore \pi \times$ diameter $= \frac{440}{1000}$

$\Rightarrow \frac{22}{7} \times \text{diameter} = \frac{440}{1000}$

$\Rightarrow \text{Diameter} = \frac{440}{1000} \times \frac{7}{22}$

= 0.14 m

48. (2) Using Rule 7,
Distance covered by wheel in one revolution
= Circumference of wheel

$= \frac{11000}{5000} = \frac{11}{5}$ metre

$= \frac{11}{5} \times 100$ cm = 220 cm

$\therefore 2\pi r = 220$

$\Rightarrow 2 \times \frac{22}{7} \times r = 220$

$\Rightarrow r = \frac{220 \times 7}{2 \times 22} = 35$ m

49. (2) Length of the rubber band
= $3d + 2\pi r$
= $(30 + 10\pi)$ cm

50. (3) The chord nearer to the centre is larger.

$\therefore \frac{15}{8} = \frac{x}{16}$

$\Rightarrow x = \frac{15 \times 16}{8} = 30$ cm

51. (2) Using Rule 14,
Perimeter of semi-circular shaped window
= $(\pi r + 2r)$ cm = $r(\pi + 2)$ cm

$= \frac{63}{2}\left(\frac{22}{7} + 2\right)$ cm

$= \frac{63}{2} \times \frac{36}{7} = 162$ cm

52. (1) Number of revolutions

$= \frac{12 \times 42}{18} = 28$

53. (2) Using Rule 14,
Perimeter of semi-circular region = 18 cm

$\therefore \pi r + 2r = 18$

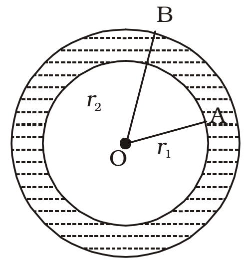
$\Rightarrow r(\pi + 2) = 18$

$\Rightarrow r\left(\frac{22}{7} + 2\right) = 18$

$\Rightarrow r\left(\frac{36}{7}\right) = 18$

$\Rightarrow r = \frac{18 \times 7}{36} = \frac{7}{2} = 3\frac{1}{2}$ cm

54. (1)



Breadth of road = $r_2 - r_1$

$\therefore 2\pi r_2 - 2\pi r_1 = 66$

$\Rightarrow 2\pi(r_2 - r_1) = 66$

$\Rightarrow r_2 - r_1 = \frac{66}{2\pi} = \frac{66 \times 7}{2 \times 22}$

= 10.5 metres

55. (4) Let the radius of circular field be r metre, then

$\frac{2\pi r}{30} - \frac{2r}{30} = \frac{30}{60}$

$\Rightarrow \frac{\pi r}{15} - \frac{r}{15} = \frac{1}{2}$

$\Rightarrow \pi r - r = \frac{15}{2}$

$\Rightarrow r(\pi - 1) = \frac{15}{2}$

$\Rightarrow r\left(\frac{22}{7} - 1\right) = \frac{15}{2}$

$\Rightarrow r \times \frac{15}{7} = \frac{15}{2}$

$\Rightarrow r = \frac{7}{2} = 3.5$ metre

56. (1) If the diameter of the circle be d units, then

$\pi d - d = X$

$\Rightarrow d(\pi - 1) = X$

$\Rightarrow d = \frac{X}{\pi - 1}$ units

57. (2) Radius of the circle

$= \frac{100}{2\pi}$ cm

When a square is inscribed in the circle, diagonal of the square is equal to diameter of the circle.

$\therefore$ Diagonal of square

$= 2 \times \frac{100}{2\pi} = \frac{100}{\pi}$ cm

$\therefore$ Side of square $= \frac{\text{Diagonal}}{\sqrt{2}}$

$= \frac{100}{\sqrt{2}\pi} = \frac{50\sqrt{2}}{\pi}$ cm.

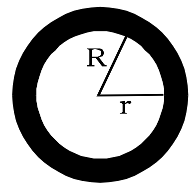
58. (3) Let the internal radius of the park be r and the external radius (with the path) be R.
The difference between the internal and external circumferences is 132 m.
i.e. $2\pi R - 2\pi r = 132$

$\Rightarrow 2\pi(R - r) = 132$

$\Rightarrow R - r = \frac{132}{2\pi} = \frac{132 \times 7}{2 \times 22} = 21$

Hence, the width of path
= 21 metres

59. (3)



Let the shaded portion be the circular path.
Let the inner radius be r metres.
$\therefore$ Outer radius R = (r + 5) metres.
According to the question,

$\frac{2\pi R}{2\pi r} = \frac{23}{22}$

$\Rightarrow \frac{R}{r} = \frac{23}{22}$

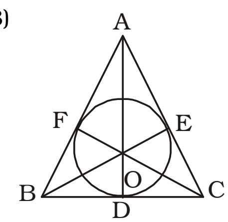
$\Rightarrow \frac{r+5}{r} = \frac{23}{22}$

$\Rightarrow$ 23r = 22r + 110

$\Rightarrow$ r = 110 metres

$\therefore$ Diameter=2×110 = 220 metres

60. (3)



OD = OE = OF = 2cm.
$\therefore$ Area of Δ ABC
= Area of Δ AOB
+ Area of Δ BOC
+ Area of Δ AOC

$\Rightarrow 6 = \frac{1}{2} \times AB \times 2 + \frac{1}{2} \times BC \times 2 + \frac{1}{2} \times CA \times 2$

$\Rightarrow$ AB + BC + CA = 6 cm

61. (2) Using Rule 18,

Circum-radius $= \frac{\text{Side}}{\sqrt{3}}$

$\therefore$ Area of circum-circle

$= \pi \times \frac{\text{side}^2}{3} = 3\pi$

$\Rightarrow \text{Side}^2 = 9 \Rightarrow \text{Side} = 3$ cm

$\therefore$ Perimeter of triangle

= 3 + 3 + 3 = 9 cm

62. (3) Using Rule 10 and 14,
Area of the square = $(\text{side})^2$
484 sq.cm. = $(\text{side})^2$

Side $= \sqrt{484} = 22$ cm

$\therefore$ Perimeter of the square
= 4 × side = 4 × 22 = 88 cm
According to the question, the circle is made by same wire.
Therefore,
Perimeter of the square
= circumference of the circle
88 cm = $2\pi r$

88 cm $= 2 \times \frac{22}{7} \times r$

$\Rightarrow r = \frac{88 \times 7}{2 \times 22} = 14$ cm

$\therefore$ Area of circle = πr^2

$= \frac{22}{7} \times (14)^2 = \frac{22}{7} \times 14 \times 14$

= 616 sq.cm.

63. (2) Using Rule 10 and 14,
Side of the square paper sheet = $\sqrt{784} = 28$ cm.
Obviously, radius of each circle

$= \frac{28}{4} = 7$ cm.

Circumference of each circular plate = $2\pi r$

$= 2 \times \frac{22}{7} \times 7 = 44$ cm

64. (4) Using Rule 10 and 14,
Let the radius of circle = r and side of square = x units,
Then,

$$\frac{\text{Area of circle}}{\text{Area of square}} = \frac{\pi r^2}{x^2} = 1$$

$\Rightarrow x^2 = \pi r^2 \Rightarrow x = \sqrt{\pi}\, r$

Now,

$$\frac{\text{Circumference of circle}}{\text{Perimeter of square}}$$

$= \frac{2\pi r}{4\sqrt{\pi}\, r} = \frac{\sqrt{\pi}}{2}$ or $\sqrt{\pi} : 2$

65. (1) Using Rule 10,
Side of square

$= \sqrt{121} = 11$ cm

$\therefore$ Length of wire = 4 × 11
= 44 cm
$\therefore 2\pi r = 44$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44$

$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7$ cm

66. (3) Using Rule 10,
Let the side of square be 1 cm, then 2 (l + b)
= 4 × side = 4 × 1
$\Rightarrow l + b = 2$, If $l = 1.5$, $b = 0.5$
$\therefore$ Area of square = 1 sq.cm.
and Area of rectangle = 1.5 × 0.5 = 0.75 sq.cm.
For a given perimeter, square has the largest area. i.e, P > Q

67. (4) Using Rule 14,
$2\pi r = 2\ (18 + 26)$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44 \times 2$

$\Rightarrow$ r = 14 cm

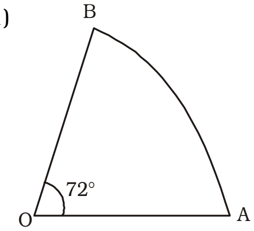
$\therefore$ Area of circle = πr^2

$= \frac{22}{7} \times 14 \times 14 = 616$ sq. cm.

68. (2) Let the side of equilateral triangle be x units.
$\therefore$ Perimeter = $3x$ units.
After increase,
Perimeter = $1.2x + 1.3x + 1.5x$
= $4x$ units
Increase = $4x - 3x = x$ units
$\therefore$ % Increase

$= \frac{x}{3x} \times 100 = \frac{100}{3} = 33\frac{1}{3}\%$

69. (1)



$\theta = 72° \rightarrow 88$m

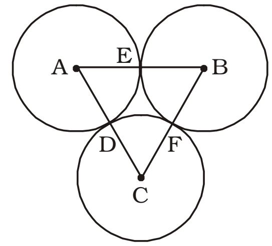
$\because 360° \rightarrow \frac{88}{72} \times 360 = 440$ m

$\Rightarrow 2\pi r = 440$

$r = \frac{440}{2} \cdot \frac{7}{22}$

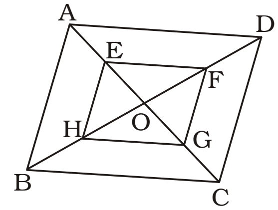
$\therefore r = 70$m
= OA which is the length of the rope.

70. (1)



AE = AD = 3.5 cm
BE = BF = 4.5 cm
CD = CF = 5.5 cm
$\therefore$ Perimeter of triangle
= AB + BC + CA
= AE + EB + BF + FC + CD+ DA
= 2(AE + BE + CD)
= 2(3.5 + 4.5 + 5.5)
= 2 × 13.5 = 27 cm

71. (3)



In Δ OAB,
Mid-point of OA = E
Mid-point of OB = H

$\therefore$ EH || AB and HE = $\frac{1}{2}$AB

Similarly, HG = $\frac{1}{2}$BC,

FG = $\frac{1}{2}$ CD and EF = $\frac{1}{2}$AD

$\therefore$ EH + HG + FG + EF

$= \frac{1}{2}$(AB + BC + CD + AD)

$\Rightarrow$ Perimeter of EFGH

$= \frac{1}{2} \times$ Perimeter of ABCD

$\therefore$ Required ratio = 1: 2

72. (1) Using Rule 14,
Circumference of circular shape
= π × diameter

$= \frac{22}{7} \times 112 = 352$ cm

= length of wire
$\therefore$ Perimeter of rectangle
= 2 (length + breadth)
$\Rightarrow 2\ (l + b) = 352$

$\Rightarrow l + b = \frac{352}{2} = 176$ $\therefore$

Smaller side of rectangle

$= \frac{7}{16} \times 176 = 77$ cm

73. (3) Perimeter of equilateral triangle = 3 × side

$\therefore$ 3 × side = 18

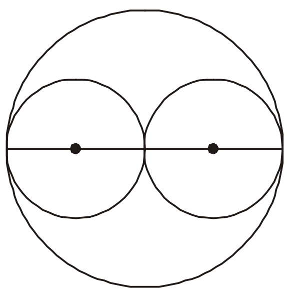
$\Rightarrow$ Side = $\frac{18}{3}$ = 6 cm.

$\therefore$ Length of median

= $\frac{\sqrt{3}}{2}$ × side

= $\frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$ cm.

74. (1) Using Rule 14,



Radius of circular paper sheet

$\frac{\text{Circumference}}{2\pi} = \frac{352}{2\pi}$

$= \frac{352}{2 \times \frac{22}{7}}$

$= \frac{352 \times 7}{2 \times 22}$ = 56 cm

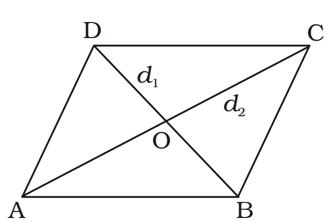
$\therefore$ Radius of each plate = $\frac{56}{2}$

= 28 cm

$\therefore$ Circumference of each circular plate = $2\pi r$

$= 2 \times \frac{22}{7} \times 28$ = 176 cm

75. (1) Using Rule 12,



AC = 24 cm = d_2

BD = 32 cm = d_1

$\therefore$ OD = 16 cm

OC = 12 cm

$\angle$COD = 90°

$\therefore$ CD = $\sqrt{OC^2 + OD^2}$

$= \sqrt{12^2 + 16^2}$

$= \sqrt{144 + 256} = \sqrt{400}$ = 20 cm

$\therefore$ Perimeter of rhombus

= 4 × CD = 4 × 20 = 80 cm

76. (1) Using Rule 18,

In-radius = $\frac{\text{Side}}{2\sqrt{3}}$

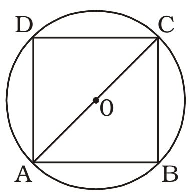
$\therefore \sqrt{3} = \frac{\text{Side}}{2\sqrt{3}}$

$\Rightarrow$ Side = $2\sqrt{3} \times \sqrt{3}$ = 6 cm

$\therefore$ Perimeter of equilateral

= 3 × 6 = 18 cm

77. (1) Using Rule 10 and 14,



Side of a square

= AB = $\sqrt{2}$ a units

$\therefore$ AC = Diagonal = $\sqrt{2} \times \sqrt{2}\ a$

= $2a$ units

= Diameter (d) of circle

$\therefore$ Circumference of circle

= $\pi \times d$

= $\pi \times 2a = 2\pi a$ units

78. (2) Using Rule 9,

Perimeter of rectangle

= 40 metre

Length = 12 metre

$\therefore$ $2(l + b) = 40$

$\Rightarrow$ $2(12 + b) = 40$

$\Rightarrow 12 + b = \frac{40}{2} = 20$

$\Rightarrow b = 20 - 12 = 8$ metre

79. (2) Using Rule 14,

Circumference of circle

= π × diameter = πd

$\therefore \pi d - d = 150$

$\Rightarrow d(\pi - 1) = 150$

$\Rightarrow d\left(\frac{22}{7} - 1\right) = 150$

$\Rightarrow d\left(\frac{22-7}{7}\right) = 150$

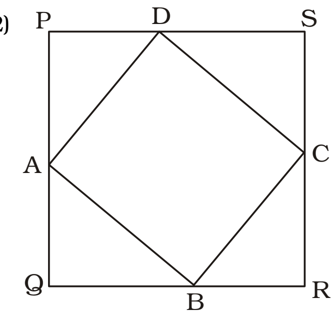
$\Rightarrow d \times \frac{15}{7} = 150$

$\Rightarrow d = \frac{150 \times 7}{15} = 70$

$\therefore$ Radius = $\frac{d}{2} = \frac{70}{2}$

= 35 metre

80. (2)



PA = AQ = QB = 5 cm.

$\therefore$ $\angle$ AQB = 90°

$\therefore$ AB = $\sqrt{AQ^2 + QB^2}$

$= \sqrt{5^2 + 5^2} = \sqrt{25 + 25} = \sqrt{50}$

$= 5\sqrt{2}$ cm.

$\therefore$ Perimeter of ABCD

$= 4 \times 5\sqrt{2} = 20\sqrt{2}$ cm.

81. (2) Using Rule 14,

Length of wire = Circumference of circle = $2\pi r$

$= 2 \times \frac{22}{7} \times 84$ = 528 cm.

$\therefore$ Perimeter of square = 528 cm.

$\Rightarrow$ 4 × side = 528

$\Rightarrow$ Side = $\frac{528}{4}$ = 132 cm.

82. (2) If the required side be x cm, then

$\frac{30}{20} = \frac{9}{x}$

$\Rightarrow 3x = 9 \times 2$

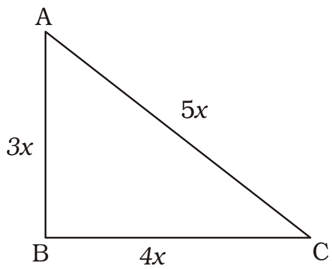
$\Rightarrow x = \frac{9 \times 2}{3}$ = 6 cm

83. (1) Using Rule 1,

Let the sides of triangle be $3x$, $4x$ and $5x$ units.

Here, $(3x)^2 + (4x)^2 = (5x)^2$

Hence, it is a right angled triangle.



Area of ΔABC

$= \frac{1}{2} \times AB \times BC$

$\Rightarrow \frac{1}{2} \times 3x \times 4x = 7776$

$\Rightarrow 6x^2 = 7776$

$\Rightarrow x^2 = \frac{7776}{6} = 1296$

$\Rightarrow x = \sqrt{1296} = 36$ cm.

$\therefore$ Perimeter of triangle

$= 3x + 4x + 5x$

$= 12x = 12 \times 36 = 432$ cm.

84. (3) Using Rule 7,

Circumference of the wheel of car $= \pi \times d$

$= \frac{22}{7} \times 70 = 220$ cm.

= Distance covered in one rotation

$\therefore$ Distance covered by car in 1 minute = (400×220) cm.

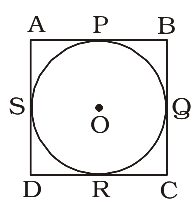
$\therefore$ Distance covered by car in 1 hour = $(400 \times 220 \times 60)$ cm.

$= \left(\frac{400 \times 220 \times 60}{1000 \times 100}\right)$ km.

= 52.8 km.

$\therefore$ Speed of car = 52.8 kmph

85. (1)



Since tangents drawn from an exterior point to a circle are equal in length.

$\therefore$ AP = AS

BP = BQ

CR = CQ

DR = DS

On adding all these,

AP + BP + CR + DR = AS + BQ + CQ + DS

$\Rightarrow$ (AP + BP) + (CR + DR) = (AS + DS) + (BQ + CQ)

$\Rightarrow$ AB + CD = BC + DA

$\Rightarrow$ 7 + 9.2 = 8.5 + DA

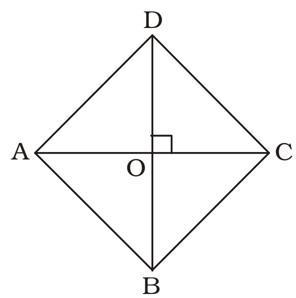
$\Rightarrow$ 16.2 = 8.5 + DA

$\Rightarrow$ DA = 16.2 – 8.5 = 7.7 cm.

86. (2) Using Rule 12,

Side of rhombus

$= \frac{\text{Perimeter}}{4} = \frac{60}{4} = 15$ cm.



d_1 = AC = 24 cm.

OC = 12 cm.

CD = 15 cm.

$\angle$COD = 90°

$\therefore$ In ΔOCD,

$OD = \sqrt{CD^2 - OC^2}$

$= \sqrt{15^2 - 12^2} = \sqrt{225 - 144}$

$= \sqrt{81} = 9$ cm.

$\therefore$ d_2 = BD = 2 × 9 = 18 cm.

$\therefore$ Area of rhombus

$= \frac{1}{2} d_1 d_2 = \frac{1}{2} \times 24 \times 18$

= 216 sq. cm.

87. (3) Using Rule 14,

$\frac{\text{Circumference}}{\text{Diameter}} = \frac{22}{7}$

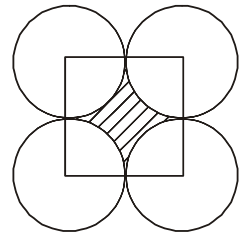
$\Rightarrow \frac{\frac{11}{7}}{2r} = \frac{22}{7}$

$\Rightarrow \frac{11}{14r} = \frac{22}{7}$

$\Rightarrow 14r \times 22 = 11 \times 7$

$\Rightarrow r = \frac{11 \times 7}{14 \times 22} = \frac{1}{4}$ metre

88. (1)



Radius of each circle $= \frac{140}{2}$

= 70 cm.

Area of the four sectors $= \pi r^2$

$= \frac{22}{7} \times 70 \times 70$

= 15400 sq. cm.

Area of square

= (140 × 140) sq. cm.

= 19600 sq. cm.

$\therefore$ Required area

= (19600 – 15400) sq. cm.

= 4200 sq. cm.

89. (2) Let the second side of triangle $= x$ cm.

$\therefore$ First side $= 2x$ cm.

Third side $= (x + 11)$ cm.

$\therefore$ Perimeter of triangle

= 67 cm.

$\Rightarrow 2x + x + x + 11 = 67$

$\Rightarrow 4x = 67 - 11 = 56$

$\Rightarrow x = \frac{56}{4} = 14$ = smallest side

90. (3) Distance covered bu whole in 1 revolution circumference of wheel

$= 2\pi r = \left(2 \times \frac{22}{7} \times 25\right)$ cm.

$\therefore$ Required number of revolutions

$= \frac{11 \times 1000 \times 100}{\left(2 \times \frac{22}{7} \times 25\right)}$ cm.

$= \frac{11 \times 100000 \times 7}{2 \times 22 \times 25} = 7000$

91. (3) Let radius of circle A be r_1 units.

Radius of semi-circle = r_2 units.

According to the question,

$2\pi r_1 = \pi r_2 + 2r_2$

$\Rightarrow 2\pi r_1 = r_2 (\pi + 2)$

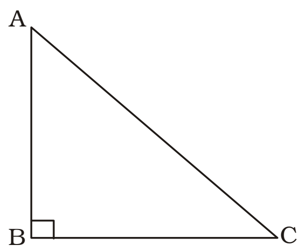
$\Rightarrow \frac{r_1}{r_2} = \frac{\pi + 2}{2\pi}$

$\therefore$ Ratio of their areas $= \frac{\pi r_1^2}{\pi r_2^2}$

$= \frac{(\pi+2)^2}{(2\pi)^2} = (\pi+2)^2 : 4\pi^2$

92. (4) PQ = QR = RS = 2 cm.
Perimeter of shaded region = Arc $\widehat{QS}$ + Arc $\widehat{PS}$ + Arc $\widehat{PQ}$
$= \pi \times 2 + \pi \times 1 + \pi \times 3$
$= 6\pi = 6 \times \frac{22}{7} = \frac{132}{7}$
$= 18\frac{6}{7}$ cm.

93. (2)



AB = BC = x cm.

$\therefore$ AC $= \sqrt{AB^2 + BC^2}$

$= \sqrt{x^2 + x^2} = \sqrt{2x^2} = \sqrt{2}x$ cm.

$\therefore$ AB + BC + CA $= 10 + 10\sqrt{2}$

$\Rightarrow 2x + \sqrt{2}x = 10 + 10\sqrt{2}$

$\Rightarrow \sqrt{2}x\left(\sqrt{2}+1\right) = 10\left(1+\sqrt{2}\right)$

$\Rightarrow \sqrt{2}x$ = 10 cm. = AC

94. (3) Distance covered by wheel in one revolution = Circumference of wheel $= 2\pi r$

$= 2 \times \frac{22}{7} \times \frac{35}{4} = 55$ cm.

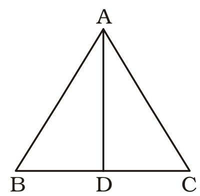
$\therefore$ Required number of revolutions

$= \frac{55 \times 100}{55} = 100$

95. (2) Ratio of the sides of triangle
$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$
$= \frac{1}{2} \times 12 : \frac{1}{3} \times 12 : \frac{1}{4} \times 12$
= 6 : 4 : 3
Sum of the terms of ratio
= 6 + 4 + 3 = 13

$\therefore$ Largest side $= \left(\frac{6}{13} \times 104\right)$ cm.
= 48 cm.

96. (3) Let the third side of isosceles triangle be x units and side of equilateral triangle be y units.
According to the question,
$2x + 2x + x = 3y$
$\Rightarrow 5x = 3y$ ..... (i)
Area of equilateral triangle
$= \frac{\sqrt{3}}{4}y^2$



AB = $2x$; BD $= \frac{x}{2}$ units

$\therefore$ AD $= \sqrt{AB^2 - BD^2}$

$= \sqrt{4x^2 - \frac{x^2}{4}}$

$= \sqrt{\frac{16x^2 - x^2}{4}} = \frac{\sqrt{15}}{2}x$

Area of isosceles triangle ABC =
$\frac{1}{2} \times x \times \frac{\sqrt{15}}{2}x$

$= \frac{\sqrt{15}}{4}x^2$

$= \frac{\sqrt{15}}{4} \times \left(\frac{3}{5}y\right)^2$

$= \frac{9\sqrt{15}}{100}y^2$

$\therefore$ Required ratio

$= \frac{9\sqrt{15}}{100}y^2 : \frac{\sqrt{3}}{4}y^2$

$= 36\sqrt{5} : 100$

97. (3) In-radius (x) $= \frac{\text{Side}}{2\sqrt{3}}$

$= \frac{2\sqrt{3}}{2\sqrt{3}} = 1$ cm.

98. (1) Sides of quadrilateral
$= 2x$, $3x$, $4x$ and $5x$ metre
According to the question,
$2x + 3x + 4x + 5x = 280$
$\Rightarrow 14x = 280 \Rightarrow x = \frac{280}{14} = 20$
$\therefore$ Largest side $= 5x = 5 \times 20$
= 100 cm.

$\boxed{\text{OR}}$

$a : b : c : d = 2 : 3 : 4 : 5$
Sum of the terms of ratio
= 2 + 3 + 4 + 5 = 14
$a + b + c + d = 280$ metre
$\therefore$ Largest side $= \frac{5}{14} \times 280$
= 100 metre

99. (2) Diameter of circle = z = $2r$

$\Rightarrow$ r $= \frac{z}{2}$ units

Circumference $= 2\pi r = 2\pi \times \frac{z}{2}$

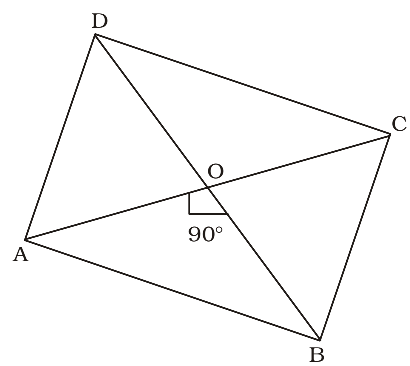
$\Rightarrow y = \pi z$ units
Area $= \pi r^2$

$\Rightarrow x = \pi\left(\frac{z}{2}\right)^2$

$\Rightarrow x = \frac{\pi z^2}{4}$ sq. units

$\therefore \frac{x}{yz} = \frac{\frac{\pi z^2}{4}}{\pi z \times z} = \frac{1}{4} = 1 : 4$

100. (1)



The diagonals of a rhombus bisect each other at right angles.
Let AC = 24 cm.
$\therefore$ AO = 12 cm.
BD = 10 cm.
$\therefore$ BO = 5 cm.
In ΔAOB,
AB $= \sqrt{OA^2 + OB^2} = \sqrt{12^2 + 5^2}$
$= \sqrt{144 + 25} = \sqrt{169}$
= 13 cm.
$\therefore$ Perimeter of rhombus
= 4 × 13 = 52 cm.

101. (4) Let each of the equal sides of isosceles triangle be a units.
$\therefore$ Perimeter of triangle
$= 2a$ + base
$\therefore 2a + 2x - 2y + 4z$
$= 4x - 2y + 6z$
$\Rightarrow 2a = 4x - 2y + 6z - (2x - 2y + 4z)$

$= (4x - 2x) + (2y - 2y) + (6z - 4z)$
$= 2x + 2z$

$\therefore\ a = \frac{1}{2}(2x + 2z) = x + z$

102. (2) In a right angled triangle,
Perpendicular^2 = base^2 + perpendicular^2
$13^2 = 12^2 + 5^2 = 144 + 25 = 169$
$\Rightarrow 13 : 12 : 5$

103. (2) Side of square field
$= \sqrt{1127.6164} = 33.58$ metre

3	$\overline{1}\,\overline{12}\overline{7}.\overline{61}\overline{64}$	33.58
3	9	
63	227	
3	189	
665	3861	
5	3325	
6708	53664	
8	53664	
6716	×	

$\therefore$ Perimeter of square field
$= (4 \times 33.58)$ metre
$= 134.32$ metre
$\therefore$ Required time

$= \left(\frac{134.32}{\frac{49}{20}}\right)$ minutes

$= \left(\frac{134.32 \times 20}{49}\right)$ minutes
$= 54.82$ minutes

TYPE-III

1. (4) Area of the floor $= 8 \times 6$
$= 48$ sq. m. $= 4800$ sq. dm.
Area of a square tile $= 4 \times 4$
$= 16$ sq. dm

$\therefore$ Number of tiles $= \frac{4800}{16} = 300$

2. (2) We will need 600 m of 50cm wide carpet to cover the floor of corridor.
$\therefore$ Total Cost = 600×15 = ₹ 9000.

3. (3) $15^2 + 20^2 = 25^2$
$\therefore$ The triangular field is right angled.
$\therefore$ Area of the field

$= \frac{1}{2} \times 15 \times 20$
$= 150$ sq. metre
Hence, Cost of sowing seeds
$= 150 \times 5 =$ ₹ 750

4. (3) Using Rule 7,
The distance travelled by wheel in one revolution

$= 2\pi r = 2 \times \frac{22}{7} \times 1.75\text{m} = 11\text{m}$

Therefore, the number of revolution to cover 11 km i.e. 11000 m by wheel

$= \frac{11000}{11} = 1000$

5. (4) Using Rule 7,
Circumference of wheel $= 2\pi r$

$= 2 \times \frac{22}{7} \times 21$ cm $= 132$ cm

$\therefore$ Number of revolutions

$= \frac{92400}{132} = 700$

6. (1) Using Rule 9,
Area of rectangular field

$= \frac{1000}{\frac{1}{4}} = 4000$ sq. metre

$\therefore$ Length $= \frac{4000}{50} = 80$ metre
New length of field = 100 metre
New area $= 100 \times 50 = 5000$ sq. metre
$\therefore$ Required expenditure

= ₹ $(5000 \times \frac{1}{4})$ = ₹ 1250

7. (4) Using Rule 10,
Percentage increase in area

$= \left(x + y + \frac{xy}{100}\right)\%$

Here, $x = 100\%$
$y = 100\%$

$= \left(100 + 100 + \frac{100 \times 100}{100}\right)\%$
$= 300\%$

8. (1) Using Rule 12,
Required per cent increase =

$\left(2x + \frac{x^2}{100}\right)\%$

$= \left(2 \times 5 + \frac{5 \times 5}{100}\right)\% = 10.25\%$

9. (4) Required per cent

$= \frac{10}{100 + 10} \times 100 = \frac{100}{11} = 9\frac{1}{11}\%$

10. (4) Using Rule 10,
Required percentage increase in area

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(20 + 20 + \frac{20 \times 20}{100}\right)\%$
$= 44\%$

11. (3) Using Rule 12,
Percentage decrease

$= \left(2x + \frac{x^2}{100}\right)\%$

$= \left(2 \times (-10) + \frac{(-10)^2}{100}\right)\%$

$= (-20 + 1)\% = -19\%$

12. (4) External radius of circular path = R metre
$\therefore 2\pi R = 528$

$\Rightarrow 2 \times \frac{22}{7} \times R = 528$

$\Rightarrow R = \frac{528 \times 7}{2 \times 22} = 84$ metre

$\therefore$ In-radius (r)
$= 84 - 14 = 70$ metre
$\therefore$ Area of path $= \pi(R^2 - r^2)$

$= \frac{22}{7}(84^2 - 70^2)$

$= \frac{22}{7}(84 + 70)(84 - 70)$

$= \frac{22}{7} \times 154 \times 14$
$= 6776$ sq. metre
$\therefore$ Required cost $= 6776 \times 10$
= Rs. 67760

13. (4) Increase in each side $= x\%$ (let)

$\therefore 2x + \frac{x^2}{100} = 44$
If $x = 20$

$2x + \frac{x^2}{100} = 2 \times 20 + \frac{400}{100}$
$= 44\%$

14. (4) Percentage increase in area =

$\left(2x + \frac{x^2}{100}\right)\%$

$= \left(2 \times 10 + \frac{10 \times 10}{100}\right)\%$
$= 21\%$

15. (2) Percentage increase in area

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(10 + 8 + \frac{10 \times 8}{100}\right)\%$

$= \left(18 + \frac{4}{5}\right)\% = 18\frac{4}{5}\%$

TYPE-IV

1. (2) Sides of the box = x, $2x$ and $3x$ cm

$\therefore$ $2(x \times 2x + 2x \times 3x + 3x \times x) = 88$

$\Rightarrow 11x^2 = 44$

$\Rightarrow x^2 = 4$

$\Rightarrow x = 2$

$\therefore$ Volume of the box

$= x \times 2x \times 3x$

$= 6x^3 = 6 \times 8 = 48$ cu.cm.

2. (1) Clearly, $r = 4$ cm, $h = 3$cm.

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi \times 16 \times 3 = 16\,\pi\,\text{cm}^3$

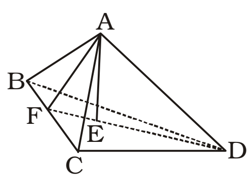
3. (1) Volume of the tetrahedron

$= \frac{1}{3} \times$ Area of base $\times$ height

$\therefore$ Area of the base

$= \frac{\sqrt{3}}{4} \times 12 \times 12 = 36\sqrt{3}$ sq.cm

A regular tetrahedron is made up of 4 equilateral triangles. One is the base triangles and other are the 3 faces.



In ΔDBC, draw DF $\perp$ BC. ΔDBC is are equilateral triangle.

DF (perpendicular) [DF 1 AF]

$= \sqrt{DC^2 - FC^2}$

$= \sqrt{12^2 - 6^2} = \sqrt{18 \times 6}$

$= 6\sqrt{3}$ = AF [altitude of ΔABC]

[ΔABC is also an equilateral Δ with side 12cm].

$FE = \frac{1}{3} \times 6\sqrt{3} = 2\sqrt{3}$ cm.

[E is the centroid].

$\therefore AE = \sqrt{AF^2 - FE^2}$

$= \sqrt{(6\sqrt{3})^2 - (2\sqrt{3})^2}$

$= \sqrt{108 - 12} = \sqrt{96} = 4\sqrt{6}$ cm

$\therefore$ Required volume

$= \frac{1}{3} \times 36\sqrt{3} \times 4\sqrt{6}$

$= 144\sqrt{2}$ cu.cm.

4. (1) Let radius are r_1 and r_2 respectively, then $\pi r_1^2 h_1 = \pi r_2^2 h_2$ where h_1 and h_2 are heights

According to question,

$h_1 : h_2 = 1 : 2$

$\therefore r_1 : r_2 = \sqrt{h_2 : h_1} = \sqrt{2:1} = \sqrt{2}:1$

5. (4) Circumference of the base, $C = 2\pi r$

where, r = radius of the base

$\Rightarrow r = \frac{C}{2\pi}$

Given; C = 66cm, h = 40cm

Volume $= \pi r^2 h$

$= \pi\left(\frac{C}{2\pi}\right)^2 h = \frac{C^2 h}{4\pi}$

$= \frac{66 \times 66 \times 40}{4 \times \frac{22}{7}}\text{cm}^3$

$= 7 \times 3 \times 66 \times 10\ \text{cm}^3$

$= 13860\ \text{cm}^3$

6. (2) Let the radii of two cylinders are r_1, r_2 and length of the cylinders are h_1, h_2 respectively.

According to the question

$\frac{r_1}{r_2} = \frac{2}{3}$ and $\frac{h_1}{h_2} = \frac{5}{3}$

$\therefore$ Ratio of their volume

$= \pi\, r_1^2 h_1 : \pi\, r_2^2 h_2$

$= r_1^2 h_1 : r_2^2 h_2$

$= (2)^2 \times 5 : (3)^2 \times 3$

$= 4 \times 5 : 9 \times 3 = 20 : 27$

7. (4) If r be radius of base and h the height, then

Curved surface of cylindrical pillar = $2\pi rh$.

and volume = $\pi r^2 h$.

$\therefore 2\pi rh = 264\ \text{m}^2$ ...(i)

$\pi r^2 h = 924\ \text{m}^3$ ...(ii)

On dividing (ii) by (i), we get

$\frac{\pi r^2 h}{2\pi rh} = \frac{924}{264}$ m.

$\Rightarrow \frac{r}{2} = \frac{924}{264}$ m

$\Rightarrow r = \frac{924 \times 2}{264}$ m = 7 m

$\therefore$ Diameter = 2 × 7 = 14m

From (i),

$h = \frac{264}{\pi \times d} = \frac{264 \times 7}{22 \times 14} = 6$m

$\therefore$ Required ratio

$= \frac{14}{6}$ i.e, 7 : 3

8. (3) The volume of iron used

$= \pi r_1^2 h - \pi r_2^2 h = \pi h\left(r_1^2 - r_2^2\right)$

$= \frac{22}{7} \times 20\left(4^2 - 3^2\right)$

$= \frac{22}{7} \times 20 \times 7 = 440$ cu.cm.

9. (1) The pipe can be assumed as hollow cylinder.

External radius $= \frac{8}{2} = 4$ cm,

Thickness = 1 cm

$\therefore$ Internal radius

= 4 – 1 = 3 cm.

Volume of the material

$= \pi\, h\, (R^2 - r^2)$

$= \frac{22}{7} \times 21 \times \left(4^2 - 3^2\right)$

$= \frac{22}{7} \times 21 \times 7$

$= 462\ \text{cm}^3$.

Now, 1cm^3 iron weighs = 8 gm

$\therefore$ $462\ \text{cm}^3$ iron weighs

= 462 × 8 gm

$= \frac{462 \times 8}{1000}$ kg

= 3.696 kg

10. (2) Volume of the cube = $(\text{edge})^3$

$= (11 \times 11 \times 11)\text{cm}^3$

$\therefore$ Volume of cylinder

= 11 × 11 × 11

$\Rightarrow \pi r^2 \times 14 = 11 \times 11 \times 11$

$\Rightarrow r^2 = \frac{11 \times 11 \times 11 \times 7}{22 \times 14} = \frac{11 \times 11}{4}$

$\Rightarrow r = \sqrt{\frac{(11)^2}{4}} = \frac{11}{2} = 5.5$ cm

11. (2) Let the radius of base be r metres.

$\therefore \pi r^2 h = 9\pi h$

$\Rightarrow r^2 = 9 \Rightarrow r = 3$ m

$\therefore$ Diameter = 2 × 3

= 6 metres.

12. (3) Curved surface area of cylinder = Area of rectangular tin foil

$\Rightarrow 2\pi rh = 16 \times 22$

$\Rightarrow 2 \times \frac{22}{7} \times r \times 16 = 16 \times 22$

$\Rightarrow r = \frac{7}{2}$ cm

$\therefore$ Volume of the cylinder = $\pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 16 = 616$ cm^3

13. (1) Let the thickness of the pipe be x cm

$\therefore$ If the external radius = 9 cm then, in radius = $(9 - x)$ cm

According to the question,

$\pi \times 9^2 \times 14 - \pi \times 14 \times (9 - x)^2 = 748$

$\Rightarrow \pi \times 14 (81 - (81 + x^2 - 18x)) = 748$

$\Rightarrow \pi \times 14 (-x^2 + 18x) = 748$

$\Rightarrow -x^2 + 18x$

$= \frac{748}{\pi \times 14} = \frac{748 \times 7}{22 \times 14}$

$\Rightarrow -x^2 + 18x = 17$

$\Rightarrow x^2 - 18x + 17 = 0$

$\Rightarrow x^2 - 17x - x + 17 = 0$

$\Rightarrow x (x - 17) - 1 (x - 17) = 0$

$\Rightarrow (x - 1) (x - 17) = 0$

$\Rightarrow x = 1$ or 17 but

$x = 17$ is inadmissible

$\therefore x = 1$ cm

14. (2) When the two iron sheets are immersed in water, it will displace water equal to its volume.

Let the water be raised in the vessel by x cm.

$\therefore\ 2 \times \frac{4}{3} \times \pi \times (3)^3 = \pi \times (6)^2 \times x$

$\Rightarrow 72\pi = 36\ \pi x$

$\Rightarrow x = \frac{72}{36} = 2$ cm

15. (1) Let the radius of the base of cylinder A be $3x$ units and that of cylinder B be $2x$ units.

Similarly, height of cylinder A = ny units and that of cylinder B be y units.

Since, Volume of cylinder = $\pi r^2 h$

According to the question

$\pi (3x)^2 \times ny = 3\pi (2x)^2 \times y$

$\Rightarrow 9x^2 y.n = 12x^2 y$

$\Rightarrow n = \frac{12}{9} = \frac{4}{3}$

16. (1) Volume of water flowing per second = $\pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 = 462$ cm^3

$\therefore$ Volume of water pumped out in 1 hour

$= 462 \times 60 \times 60$ cm^3

$= 1663200$ cm^3 = 1663.2 litres

17. (4) Let the radius of base be r cm and height be 16 cm.

then $2\pi rh = 1056$

$\Rightarrow\ 2 \times \frac{22}{7} \times r \times 16 = 1056$

$\Rightarrow\ r = \frac{1056 \times 7}{2 \times 22 \times 16} = \frac{21}{2}$ cm

$\therefore$ Volume of the cylinder = $\pi r^2 h$

$= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 16 = 5544$ cm^3

18. (3) Let the radius of the new cylinder be R then,

$2\pi r^2 h = \pi R^2 h$

$\Rightarrow\ R^2 = 2r^2 \Rightarrow R = \sqrt{2}r = r\sqrt{2}$

19. (1) $\frac{d_1}{d_2} = \frac{r_1}{r_2} = \frac{3}{2}$

$\therefore\ \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = 1 \Rightarrow \frac{9}{4} \times \frac{h_1}{h_2} = 1$

$\Rightarrow \frac{h_1}{h_2} = \frac{4}{9} \Rightarrow 4 : 9$

20. (1) Volume of the remaining solid

$\pi r^2 h - \frac{1}{3}\pi r^2 h$

$= \frac{2}{3}\pi r^2 h = \frac{2}{3}\pi \times 6 \times 6 \times 10$

$= 240\pi$ cu.cm.

21. (3) Volume of solid cylinder $= \pi r^2 h$

Volume of cone = $\frac{1}{3}\pi r^2 h$

Difference = $\pi r^2 h - \frac{1}{3}\pi r^2 h$

$= \frac{2}{3}\pi r^2 h = \frac{2}{3} \times \frac{22}{7} \times 5 \times 5 \times 12$

$= 628.57$ cu.cm.

22. (1) Let radius be increased by x cm.

then Volume of cylinder

$= \pi(10 + x)^2 \times 4$

Again, let height be increased by x cm.

then Volume of cylinder

$= \pi \times 10^2 (4 + x)$

$\therefore\ \pi (10 + x)^2 \times 4$

$= \pi (10)^2 (4 + x)$

$\Rightarrow\ (10 + x)^2 = 25 (4 + x)$

$\Rightarrow\ 100 + 20x + x^2 = 100 + 25x$

$\Rightarrow\ x^2 - 5x = 0 \Rightarrow x (x - 5) = 0$

$\Rightarrow\ x = 5$ cm

23. (2)

$\frac{\text{Volume of cylinder}}{\text{Volume of cone}} = \frac{\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$

$= 3.\left(\frac{r_1}{r_2}\right)^2 \left(\frac{h_1}{h_2}\right)$

$= 3 \times \left(\frac{\sqrt{3}}{\sqrt{2}}\right)^2 \times \frac{\sqrt{2}}{\sqrt{3}}$

$= 3 \times \frac{\sqrt{3}}{\sqrt{2}} = 3\sqrt{3} : \sqrt{2}$

24. (4) $2\pi rh : 2\pi rh + 2\pi r^2 = 1 : 2$

$\Rightarrow 2\pi rh : 616 = 1 : 2$

$\Rightarrow 2\pi rh = \frac{616}{2} = 308$

$\therefore 2\pi rh + 2\pi r^2 = 616$

$\Rightarrow 308 + 2\pi r^2 = 616$

$\Rightarrow 2\pi r^2 = 308$

$\Rightarrow r^2 = \frac{308 \times 7}{22 \times 2} = 49$

$\Rightarrow r = 7$

$\therefore 2 \times \frac{22}{7} \times 7 \times h = 308$

$\Rightarrow h = \frac{308}{44} = 7$

$\therefore$ Volume of cylinder = $\pi r^2 h$

$= \frac{22}{7} \times 7 \times 7 \times 7 = 1078$ cu.cm.

25. (4) If the radius of base of cylinder be r units and its height be h units, then

$2\pi r = a$

$\Rightarrow\ r = \frac{a}{2\pi}$ units

$\therefore$ Volume of cylinder = $\pi r^2 h$

$\Rightarrow\ V = \pi \times \frac{a^2}{4\pi^2} \times h$

$\Rightarrow\ h = \frac{4\pi V}{a^2}$ units

26. (4) Volume of sphere

$= \frac{4}{3}\pi \times (6)^3$ cu. cm.

$\therefore$ Volume of cylinder = $\pi r^2 h$

$= \pi \times (6)^2 \times h$

Now, $\pi \times (6)^2 \times h = \frac{4}{3}\pi \times (6)^3$

$\Rightarrow \pi = \frac{4}{3} \times 6 = 8$ cm.

27. (1) Diagonal of cube $=\sqrt{3a^2}$

$\therefore$ According to question,

$\sqrt{3}\,a = 2\sqrt{3}$

$\Rightarrow a = 2$

$\therefore$ Its volume $= a^3 = 2^3$

$= 8$ cu cm

28. (1) Volume of cube = $(\text{Side})^3$

$\therefore$ Ratio of volume = 27 : 1

$\therefore$ Ratio of the edges $=\sqrt[3]{\dfrac{27}{1}}$

or 3 : 1

29. (3) Surface area of cuboid

$= 2 \times (l \times b + b \times h + h \times l)$

$= 2\,(3x \times 2x + 2x \times x + x \times 3x)$

$= 2\,(6x^2 + 2x^2 + 3x^2) = 22x^2$

$\therefore 22x^2 = 88$

$\Rightarrow x^2 = 4$

$\Rightarrow x = \sqrt{4} = 2$

$\therefore l = 6$ cm, $b = 4$ cm, $h = 2$ cm

$\therefore$ Volume of cuboid $= l \times b \times h$

$= 6 \times 4 \times 2\ \text{cm}^3 = 48\ \text{cm}^3$

30. (3) Diagonal of a cube

$= \sqrt{3} \times \text{side}$

$\Rightarrow 4\sqrt{3} = \sqrt{3} \times \text{side}$

$\therefore$ Side = 4 cm

$\therefore$ Volume of the cube

$= (\text{side})^3 = (4)^3 = 64\ \text{cm}^3$

31. (2) Let the length of tank = x dm

Depth $= \dfrac{x}{3}$ dm

$\Rightarrow$ Breadth $= \left(x - \dfrac{x}{3}\right) \times \dfrac{1}{3} \times \dfrac{1}{2}$

$= \dfrac{2x}{3} \times \dfrac{1}{3} \times \dfrac{1}{2} = \dfrac{x}{9}$ dm

$\therefore$ Volume of tank

$= x \times \dfrac{x}{9} \times \dfrac{x}{3} = \dfrac{x^3}{27}$

According to the question,

$\dfrac{x^3}{27} = 216$

$\Rightarrow x^3 = 27 \times 216$

$\Rightarrow x = (27 \times 216)^{1/3}$

$\therefore x = 3 \times 6 = 18$ dm

32. (1) The external dimensions of the box are :

Length = 20 cm, Breadth = 12cm, Height = 10 cm

External volume of the box

$= 20 \times 12 \times 10 = 2400\ \text{cm}^3$.

Thickness of the wood = 1 cm

Internal length = 20 – 2 = 18 cm

$\therefore$ Internal breadth

= 12 – 2 = 10 cm

Internal height = 10 – 2 = 8 cm

Internal volume

$= 18 \times 10 \times 8 = 1440\ \text{cm}^3$.

Volume of the wood

$= (2400 - 1440)\ \text{cm}^3 = 960\ \text{cm}^3$.

33. (1) If l, b, h be the dimensions of the cuboid, then volume of the cuboid $= l \times b \times h$

Now, $x = l \times b$, $y = l \times h$,

$z = b \times h$

$\therefore xyz = l^2\, b^2\, h^2 = v^2$

34. (4) Water supplied by pipe in 1 hour $= (0.3 \times 0.2 \times 20 \times 1000)$ cubic metre = 1200 cubic metre

$\therefore$ Total time

$= \dfrac{\text{Volume of water to be filled in the tank}}{1200}$

$= \dfrac{200 \times 150 \times 8}{1200} = 200$ hours

35. (1) Length of the box

$= 40 - 2 \times 4 = 32$ cm

Breadth of the box $= 15 - 2 \times 4 = 7$ cm

Height of the box = 4 cm

$\therefore$ Volume of the box $= 32 \times 7 \times 4 = 896$ cu. cm.

36. (4) Let the length, breadth and height of the cuboid be x, y and z cm respectively, then

$xy = 12$; $yz = 20$; $zx = 15$

$\therefore x^2y^2z^2 = 12 \times 20 \times 15$

$= 3600\ \text{cm}^6$

$\therefore v = xyz = \sqrt{3600} = 60\ \ \text{cm}^3$

37. (4) Let the length, breadth and height of a cuboid be l, b and h units respectively, then

$p = lb$; $q = bh$, $r = hl$

$\Rightarrow pqr = l^2b^2h^2$

$\therefore$ Volume of the cuboid $= lbh$

$= \sqrt{pqr}$

38. (2) If the height of the godown be h metre, then

$2(15 \times 12) = 2 \times h(15 + 12)$

$\Rightarrow 27h = 15 \times 12$

$\Rightarrow h = \dfrac{15 \times 12}{27} = \dfrac{20}{3}$ metre

$\therefore$ Volume of the godown

$= \dfrac{15 \times 12 \times 20}{3}$

= 1200 cu.metre

39. (3) Let Edge of cube = x cm

$\therefore 6x^2 = 96 \Rightarrow x^2 = \dfrac{96}{6} = 16$

$\Rightarrow x = \sqrt{16} = 4$ cm

Volume of cube $= (\text{edge})^3 = (4)^3$

= 64 cu. cm

40. (2) Let the height be h_1 and h_2 and radii be r and 2r respectively.

$\therefore \dfrac{V_1}{V_2} = \dfrac{\frac{1}{3}\pi r^2 h_1}{\frac{1}{3}\pi (2r)^2 \times h_2}$

$\Rightarrow \dfrac{r^2 \times h_1}{4r^2 \times h_2} = \dfrac{2}{3}$

$\Rightarrow \dfrac{h_1}{h_2} = \dfrac{2}{3} \times \dfrac{4}{1} = \dfrac{8}{3} = 8 : 3$

41. (3) Case I : When height $= h_1$, radius $= r_1$,

Volume of the cone $V_1 = \dfrac{1}{3}\pi r_1^2 h_1$

Case II,

When height $h_2 = 2h_1$,

radius $r_2 = r_1$ [radius is same]

Volume of the cone V_2

$= \dfrac{1}{3}\pi r_1^2 . 2h_1$

$\therefore$ The required ratio = 1 : 2

42. (4) Volume of original cone, V_1

$= \dfrac{1}{3}\pi r^2 h$

Now, radius of new cone, $r_1 = 2r$

height, $h_1 = h$

$\therefore$ Volume $V_2 = \dfrac{1}{3}\pi r_1^2 h_1$

$= \dfrac{1}{3}\pi (2r)^2 \times h = \dfrac{4}{3}\pi r^2 h$

$\therefore \dfrac{V_2}{V_1} = \dfrac{\frac{4}{3}\pi r^2 h}{\frac{1}{3}\pi r^2 h} = 4 : 1$

43. (1) Volume of sphere

$= \dfrac{4}{3}\pi \times 8^3$ = Volume of cone

Volume of cone $= \dfrac{1}{3}\pi r^2 h$

$\therefore \dfrac{1}{3} \times \pi \times 8 \times 8 \times h$

$= \dfrac{4}{3}\pi \times 8^3$

$\Rightarrow h = 32$ cm.

$\therefore$ Slant height $= \sqrt{h^2 + r^2}$

$= \sqrt{32^2 + 8^2} = \sqrt{1024 + 64}$

$= \sqrt{64\,(16+1)} = 8\sqrt{17}$ cm.

44. (1) Volume of the cone

$= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times (15)^2 \times 15$

$= \frac{1}{3}\pi \times (15)^3 \text{ cm}^3$

Volume of the wooden sphere

$= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times (15)^3 \text{ cm}^3$

Wasted wood

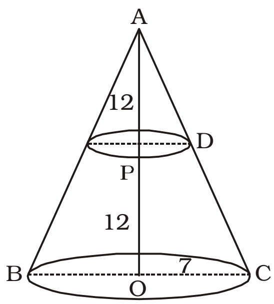
$= \frac{4}{3}\pi \times (15)^3 - \frac{1}{3}\pi(15)^3$

$= \pi \times (15)^3 \text{ cm}^3$

$\therefore$ Required percentage

$= \frac{\pi \times (15)^3}{\frac{4}{3}\pi(15)^3} \times 100 = 75\%$

45. (2)



In ΔAPD and ΔAOC

$\frac{AP}{AO} = \frac{PD}{OC}$ [$\because \Delta APD \cong \Delta AOC$]

$PD = \frac{AP \times OC}{AO} = \frac{12 \times 7}{24} = 3.5$ cm

$\therefore$ Volume $= \frac{1}{3}\pi r^2 \times h$

$= \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12$

$= 154$ cm³

46. (4) Area of the base of cone $= 770$ cm²

$\Rightarrow \pi r^2 = 770$

$\Rightarrow \frac{22}{7} r^2 = 770$

$\Rightarrow r^2 = \frac{770 \times 7}{22} = 245$

$\therefore r = \sqrt{245} = 7\sqrt{5}$ cm

Curved surface area of the cone $= \pi r l = 814$

$\Rightarrow \frac{22}{7} \times 7\sqrt{5} \times l = 814$

$\Rightarrow l = \frac{814}{22 \times \sqrt{5}} = \frac{37}{\sqrt{5}}$ cm

Let the height of the cone be h cm, then $h^2 + r^2 = l^2$

$\Rightarrow h^2 + (7\sqrt{5})^2 = \left(\frac{37}{\sqrt{5}}\right)^2$

$\Rightarrow h^2 + 245 = \frac{1369}{5}$

$\Rightarrow h^2 = \frac{1369}{5} - 245$

$\Rightarrow h^2 = \frac{1369 - 1225}{5} = \frac{144}{5}$

$\Rightarrow h = \frac{12}{\sqrt{5}}$ cm

$\therefore$ Volume of the cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7\sqrt{5} \times 7\sqrt{5} \times \frac{12}{\sqrt{5}}$

$= 616\sqrt{5}$ cm³

47. (4) Let the height of the cones be h_1 and h_2 respectively.

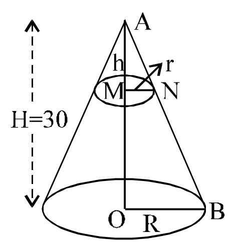
$\therefore \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{1}{4}$

(r_1 and r_2 are radii)

$\Rightarrow \frac{h_1}{h_2} = \frac{1}{4} \times \frac{r_2^2}{r_1^2} = \frac{1}{4} \times \frac{25}{16} = \frac{25}{64}$

$\Rightarrow 25 : 64$

48. (4) Let H and R be the height and radius of bigger cone respectively and h and r that of smaller cone.



From triangles AOB and AMN.

$\angle A$ is common and $MN \parallel OB$.

$\therefore$ Triangles AOB and AMN are similar,

$\therefore \frac{AO}{AM} = \frac{BO}{MN}$

$\Rightarrow \frac{30}{h} = \frac{R}{r}$ ...(*i*)

Volume of smaller cone $= \frac{1}{3}\pi r^2 h$

Volume of bigger cone $= \frac{1}{3}\pi R^2 H$

According to the question,

$\frac{1}{3}\pi r^2 h = \left(\frac{1}{3}\pi R^2 H\right) \times \frac{1}{27}$

$\Rightarrow r^2 h = \frac{R^2 H}{27} \Rightarrow 27 r^2 h = R^2 H$

$\Rightarrow \frac{27h}{H} = \frac{R^2}{r^2}$

$\Rightarrow \frac{27h}{H} = \left(\frac{30}{h}\right)^2$ [From (i)]

$\Rightarrow \frac{27h}{H} = \frac{900}{h^2}$

$\Rightarrow 27h^3 = 900H = 900 \times 30$

$\Rightarrow h^3 = \frac{900 \times 30}{27} = 1000$

$\Rightarrow h = \sqrt[3]{1000} = 10$ cm

$\therefore$ Required height $= 30 - 10 = 20$ cm

49. (2) Let the radius of the base of the cone be $5x$ cm and its height be $12x$ cm.

$\therefore V = \frac{1}{3}\pi r^2 h$

$\Rightarrow 314\frac{2}{7} = \frac{1}{3} \times \frac{22}{7} \times 5x \times 5x \times 12x$

$\Rightarrow x^3 = \frac{2200 \times 3 \times 7}{7 \times 22 \times 25 \times 12} = 1$

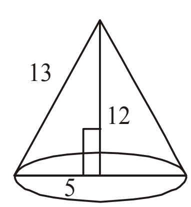
$\Rightarrow x = 1$

$\therefore$ Slant height of the cone

$= \sqrt{5^2 + 12^2} = \sqrt{25 + 144}$

$= \sqrt{169} = 13$ cm.

[Note : For a right circular cone, $5^2 + 12^2 = 13^2$]



50. (3) Let the height be h units.

$\therefore \frac{1}{3}\pi h(r_1^2 + r_2^2) = \frac{4}{3}\pi R^3$

$\Rightarrow h(r_1^2 + r_2^2) = 4R^3$

$\Rightarrow h = \frac{4R^3}{r_1^2 + r_2^2}$

51. (1) $\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$

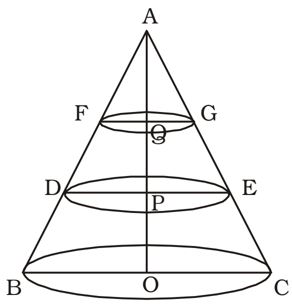
$= \left(\frac{3}{4}\right)^2 \times \frac{4}{3}$

$= \frac{3}{4} \times \frac{3}{4} \times \frac{4}{3} = \frac{3}{4} \Rightarrow 3 : 4$

52. (4) Let FQ = r_1, DP = r_2 and BO = r_3

Also, AQ = QP = PO = $\frac{h}{3}$

From Δ AFQ and Δ ADP,



$\frac{FQ}{DP} = \frac{AQ}{AP}$

$\Rightarrow \frac{r_1}{r_2} = \frac{1}{2} \Rightarrow r_2 = 2r_1$

From Δ AFQ and Δ ABO,

$\frac{FQ}{BO} = \frac{AQ}{AO}$

$\Rightarrow \frac{r_1}{r_3} = \frac{1}{3} \Rightarrow r_3 = 3r_1$

$\therefore V_1 : V_2 : V_3 = \frac{1}{3}\pi r_1^2 \times \frac{h}{3}$:

$\frac{1}{3}\pi \frac{h}{3}\left(r_1^2 + r_2^2 + r_1 r_2\right)$

: $\frac{1}{3}\pi \frac{h}{3}\left(r_2^2 + r_3^2 + r_2 r_3\right)$

$= r_1^2 : \left(r_1^2 + 4r_1^2 + 2r_1^2\right)$

$: \left(4r_1^2 + 9r_1^2 + 6r_1^2\right)$

$= r_1^2 : 7r_1^2 : 19r_1^2$

$= 1 : 7 : 19$

53. (1) Volume of bucket

$= \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

$= \frac{1}{3} \times \frac{22}{7} \times 45(28^2 + 7^2 + 28 \times 7)$

$= \frac{1}{3} \times \frac{22}{7} \times 45(784 + 49 + 196)$

$= \frac{1}{3} \times \frac{22}{7} \times 45 \times 1029$

= 48510 cu. cm.

54. (3) Let, Height of the cone = $3x$ cm and diameter = $2x$ cm.

$\therefore$ Radius = x cm.

Volume = $\frac{1}{3}\pi r^2 h$

$\Rightarrow 1078 = \frac{1}{3} \times \frac{22}{7} \times x^2 \times 3x$

$\Rightarrow 1078 = \frac{22}{7} x^3$

$\Rightarrow x^3 = \frac{1078 \times 7}{22} = 343$

$\Rightarrow x = \sqrt[3]{343} = 7$

$\therefore$ Height = 3 × 7 = 21 cm

55. (2) Original volume of cone

$= \frac{1}{3}\pi r^2 h$

New volume of cone

$= \frac{1}{3}\pi (2r)^2 h = \frac{4}{3}\pi r^2 h$

$= 4 \times \frac{1}{3}\pi r^2 h$

i.e. Four times of the previous volume.

56. (1) Required ratio

$= \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$

$= \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2} = \left(\frac{3}{5}\right)^2 \times \frac{1}{3}$

$= \frac{3}{25} \Rightarrow 3 : 25$

57. (2) $\frac{1}{3}\pi a^2 h = \frac{4}{3}\pi a^3$

$\Rightarrow h = 4a$

58. (3) Circumference of the base of cone = 33 cm

$\Rightarrow 2\pi r = 33$

$\Rightarrow 2 \times \frac{22}{7} \times r = 33$

$\Rightarrow r = \frac{33 \times 7}{2 \times 22} = \frac{21}{4}$ cm

$\therefore$ Volume of the cone

$= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times \frac{21}{4} \times \frac{21}{4} \times 16$

= 462 cu.cm.

59. (2) $2\pi r = 8 \Rightarrow \pi r = 4$

$\Rightarrow r = \frac{4}{\pi}$

$\therefore V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times \frac{4 \times 4}{\pi \times \pi} \times 21$

$= \frac{112}{\pi}$ cu.cm.

60. (3) $\frac{V_1}{V_2} = \frac{r_1^2 h_1}{r_2^2 h_2}$

$\Rightarrow \frac{4}{1} = \frac{25}{16} \times \frac{h_1}{h_2}$

$\Rightarrow \frac{h_1}{h_2} = \frac{16 \times 4}{25} = \frac{64}{25}$ or 64 : 25

61. (4) $\pi r^2 = 154$

$\Rightarrow \frac{22}{7} \times r^2 = 154$

$\Rightarrow r^2 = \frac{154 \times 7}{22} \Rightarrow r = 7$ metre

$\therefore \frac{1}{3}\pi r^2 h = 1232$

$\Rightarrow \frac{h}{3} = \frac{1232}{154} = 8$

$\Rightarrow h = 24$ metre

Area of canvas curved surface area of cone = πrl

$= \pi r\sqrt{h^2 + r^2}$

$= \frac{22}{7} \times 7 \times \sqrt{24^2 + 7^2}$ sq. metre

= 22 × 25 = 550 sq. metre

$\therefore$ Its length = $\frac{550}{2} = 275$ metre

62. (2) Ratio of the volumes of cone

$= \frac{\frac{1}{3}\pi r_1^2 h}{\frac{1}{3}\pi r_2^2 h} = \left(\frac{r_1}{r_2}\right)^2 = \left(\frac{3}{4}\right)^2$

$= \frac{9}{16}$ or 9 : 16

63. (3) External radius,

$R = \frac{6}{2} = 3$ cm

Internal radius, r

$= 3 - \frac{1}{2} = \frac{5}{2}$ cm.

$\therefore$ Volume of hollow sphere (material)

$= \frac{4}{3}\pi(R^3 - r^3)$

$= \frac{4}{3}\pi\left[3^3 - \left(\frac{5}{2}\right)^3\right]$ cm^3

$= \frac{4}{3} \times \frac{22}{7}\left(27 - \frac{125}{8}\right)$ cm.^{3}

$= \frac{4}{3} \times \frac{22}{7}\left(\frac{216-125}{8}\right)$ cm^3

$= \frac{4}{3} \times \frac{22}{7} \times \frac{91}{8}$

$= \frac{143}{3} = 47\frac{2}{3}$ cm^3

64. (2) According to question

$r_1 + r_2 = 10$ ... (i)

$\frac{4}{3}\pi(r_1^3 + r_2^3) = 880$

$\Rightarrow r_1^3 + r_2^3 = \frac{880 \times 3 \times 7}{22 \times 4} = 210$ ...(ii)

$\therefore (r_1 + r_2)^3 = 1000$

$\Rightarrow r_1^3 + r_2^3 + 3r_1r_2(r_1 + r_2) = 1000$

$\Rightarrow 210 + 3r_1r_2(10) = 1000$

$\Rightarrow 30r_1r_2 = 1000 - 210 = 790$

$\Rightarrow r_1r_2 = \frac{790}{30} = \frac{79}{3} = 26\frac{1}{3}$

65. (4) Volume of sphere

$= \frac{4}{3}\pi r^3$

Volume of second sphere

$= \frac{4}{3}\pi(2r)^3 = 8 \times \left(\frac{4}{3}\pi r^3\right)$

66. (4) Ratio of the volume of both

spheres $= \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3}$

$= \left(\frac{r_1}{r_2}\right)^3 = \left(\frac{3}{2}\right)^3 = \frac{27}{8}$

or 27 : 8

67. (2) If the radius of the solid hemisphere be r cm,

then total surface area $= 3\pi r^2$

$\Rightarrow 3\pi r^2 = 108\pi$

$\Rightarrow r^2 = \frac{108}{3} = 36$

$\Rightarrow r = \sqrt{36} = 6$ cm

$\therefore$ Volume of the hemisphere

$= \frac{2}{3}\pi r^3$

$= \frac{2}{3}\pi \times 6 \times 6 \times 6$

$= 144\pi$ cubic cm

68. (4) Radius of the largest sphere

$= \frac{7}{2}$ cm

$\therefore$ Volume of sphere $= \frac{4}{3}\pi r^3$

$= \left(\frac{4}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}\right)$ cm^3

$= 179.67$ cm^3

69. (3) Let the radii of the first and second sphere be r_1 and r_2 units respectively.

According to the question,

$\frac{4\pi r_1^2}{4\pi r_2^2} = \frac{4}{9}$

$\Rightarrow \frac{r_1^2}{r_2^2} = \frac{4}{9} \Rightarrow \frac{r_1}{r_2} = \frac{2}{3}$

$\therefore \frac{V_1}{V_2} = \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{r_1^3}{r_2^3}$

$= \left(\frac{2}{3}\right)^3 = \frac{8}{27}$ or 8 : 27

70. (4) Let the radius of sphere be r_1 units and that of hemisphere be r_2 units, then,

$\frac{4}{3}\pi r_1^3 = \frac{2}{3}\pi r_2^3$

$\Rightarrow \left(\frac{r_1}{r_2}\right)^3 = \frac{1}{2}$

$\Rightarrow \frac{r_1}{r_2} = \frac{1}{\sqrt[3]{2}}$ or $1 : \sqrt[3]{2}$

71. (1) Volume of original sphere

$= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 3 \times 3 \times 3$

$= 36\pi$ cu. cm.

$\therefore 8 \times \frac{4}{3}\pi r_1^3 = 36\pi$

$\Rightarrow r_1^3 = \frac{36 \times 3}{8 \times 4} = \frac{27}{8}$

$\therefore r_1 = \sqrt[3]{\frac{27}{8}} = \frac{3}{2} = 1.5$ cm

72. (1) Surface area of sphere $= 4\pi r^2$

$\Rightarrow 4\pi r^2 = 8\pi$

$\Rightarrow r^2 = 2 \Rightarrow r \Rightarrow \sqrt{2}$ units

$\therefore$ Volume of sphere

$= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times (\sqrt{2})^3$

$= \frac{8\sqrt{2}}{3}\pi$ cubic units

73. (3) Volume of the pyramid $= \frac{1}{3} \times$ height $\times$ area of the base

$= \frac{1}{3} \times 10 \times 57 = 190$ cu.cm.

74. (3) Area of the base

$= 6 \times \frac{\sqrt{3}}{4} \times (2a)^2$

$= 6 \times \frac{\sqrt{3}}{4} \times 4a^2 = 6\sqrt{3}a^2$ sq.cm.

Height $= \sqrt{\left(\frac{5a}{2}\right)^2 - (2a)^2}$

$= \sqrt{\frac{25}{4}a^2 - 4a^2} = \sqrt{\frac{9a^2}{4}}$

$= \frac{3}{2}a$ cm.

$\therefore$ Volume of pyramid

$= \frac{1}{3} \times$ area of base $\times$ height

$= \frac{1}{3} \times 6\sqrt{3}a^2 \times \frac{3}{2}a$

$= 3\sqrt{3}a^3$ cm^3

75. (3) Area of the base $= 40 \times 40$ $= 1600$ sq.cm

We know, Volume of pyramid

$= \frac{1}{3} \times$ area of base $\times$ height

$\Rightarrow 8000 = \frac{1}{3} \times 1600 \times h$

$\Rightarrow h = \frac{8000 \times 3}{1600} = 15$ cm

76. (3) Area of the base

$= \frac{1}{2}$ (sum of parallel sides) $\times$(perpendicular distance)

$= \frac{1}{2}$ $(14 + 8) \times 8 = 88$ sq. cm.

$\therefore$ Volume = Area of the base $\times$ height

$\Rightarrow 1056 = 88 \times h$

$\Rightarrow h = \frac{1056}{88} = 12$ cm

77. (3) Total surface area of prism = Curved surface area + 2 $\times$ Area of base

$\Rightarrow$ 608 = Perimeter of base $\times$ height + 2 $\times$ Area of base

$\Rightarrow 608 = 4x \times 15 + 2x^2$

(Where x = side of square)

$\Rightarrow x^2 + 30x - 304 = 0$

$\Rightarrow x^2 + 38x - 8x - 304 = 0$

$\Rightarrow x(x + 38) - 8(x + 38) = 0$

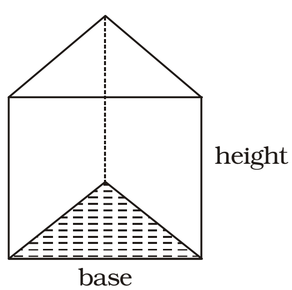
$\Rightarrow (x - 8)(x + 38) = 0$

$\Rightarrow x = 8$

$\Rightarrow$ Volume of prism = Area of base $\times$ height

$= 8 \times 8 \times 15 = 960$ cu. cm.

78. (2) Area of the base $= \frac{\sqrt{3}}{4} \times (\text{side})^2$



$= \frac{\sqrt{3}}{4} \times 8 \times 8 = 16\sqrt{3}$ sq. cm

$\therefore$ Volume of prism = Area of base $\times$ height

$= 16\sqrt{3} \times 10 = 160\sqrt{3}$ cu. cm

79. (4) Volume of prism = Area of base $\times$ height

$\Rightarrow 366 = \frac{1}{2} \times 4 \times 28 \times h$

$\Rightarrow h = \frac{366}{56} = 6.53$ cm

80. (1) Area of base = Area of right angled triangle

$= \frac{1}{2} \times 5 \times 12 = 30$ sq.cm.

$[\because 5^2 + 12^2 = 13^2]$

$\therefore$ Volume $= \frac{1}{3} \times$ Area of base $\times$ height

$\Rightarrow 330 = \frac{1}{3} \times 30 \times h$

$\Rightarrow h = \frac{330}{10} = 33$ cm

81. (1) Volume of earth : Volume of moon

$= \frac{4}{3}\pi r^3 : \frac{4}{3}\pi\left(\frac{r}{4}\right)^3 = 64 : 1$

82. (3) In both the vessels, the volume of liquid will be same.

$\therefore$ Volume of liquid in cylinder = Volume of liquid in cone.

Let the height of liquid column in cylinder be h cm, then

$\pi r^2 h = \frac{1}{3}\pi \times (12)^2 \times 50$

$\therefore h = \frac{1}{3} \times \frac{12 \times 12 \times 50}{10 \times 10} = 24$cm

83. (2) Volume of the cone

$= \frac{1}{3}\pi \times (15)^2 \times 108$ cm

Volume of cylinder

$= \pi \times r^2 \times 9$ cm^3

According to the question,

$\pi \times r^2 \times 9$

$= \frac{1}{3}\pi \times 15 \times 15 \times 108$

$\Rightarrow r^2 = \frac{5 \times 15 \times 108}{9}$

$\Rightarrow r^2 = 900 \Rightarrow r = 30$

Diameter of base

$= 2r = 2 \times 30 = 60$ cm.

84. (2) Total surface area of cube $= 6x^2$

Surface area of sphere $= 4\pi r^2$

According to question

$6x^2 = 4\pi r^2$

$\Rightarrow r = \sqrt{\frac{6x^2}{4\pi}} = \frac{x\sqrt{6}}{2\sqrt{\pi}}$

So, Volume of sphere

$= \frac{4}{3}\pi \times \frac{x\sqrt{6}}{2\sqrt{\pi}} \times \frac{x\sqrt{6}}{2\sqrt{\pi}} \times \frac{x\sqrt{6}}{2 \times \sqrt{\pi}}$

$= \frac{4}{3}\pi \times \frac{6x^2 \times x\sqrt{6}}{8\pi \times \sqrt{\pi}}$

$\therefore$ Required ratio

$= \frac{x^3 \times 3 \times 8\pi \times \sqrt{\pi}}{4\pi \times 6x^3 \times \sqrt{6}} = \frac{\sqrt{\pi}}{\sqrt{6}} = \sqrt{\pi} : \sqrt{6}$

85. (2) $2\pi r = 22$

$\Rightarrow 2 \times \frac{22}{7} \times r = 22 \therefore r = \frac{7}{2}$

Volume of cylinder $= \pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 = 462$ cm^3

86. (2) As the sphere fits exactly inside the cube, the diameter of sphere will be equal to the edge of cube.

Let the edge of cube be x units.

$\therefore$ Radius of sphere $= \frac{x}{2}$

Then,

$\frac{\text{Volume of cube}}{\text{Volume of sphere}}$

$= \frac{x^3}{\frac{4}{3}\pi\left(\frac{x}{2}\right)^3} = \frac{6}{\pi}$ or $6 : \pi$

87. (1) Volume of sphere $= \frac{4}{3}\pi r^3$

Volume of cylinder $= \pi r^2 h$

As given,

$\pi r^2 h = \frac{4}{3}\pi r^3 \Rightarrow h = \frac{4}{3}r$

$\Rightarrow \frac{h}{r} = \frac{4}{3} \Rightarrow \frac{h}{2r} = \frac{4}{3 \times 2} = \frac{2}{3}$

$\Rightarrow \frac{d}{h} = \frac{3}{2}$, where $d = 2r$

or 3 : 2

88. (3) When the rectangular sheet is rolled along its length, the length of the sheet forms the circumference of the base of cylinder and breadth of sheet forms the height of cylinder.

Circumference = 100

$\Rightarrow 2\pi r = 100$

$\Rightarrow 2 \times \frac{22}{7} \times r = 100$

$\Rightarrow r = \frac{700}{44} = \frac{175}{11}$ cm

$\therefore$ Volume of the cylinder

$= \pi r^2 h$

$= \frac{22}{7} \times \frac{175}{11} \times \frac{175}{11} \times 44$

$= \frac{245000}{7} = 35000$ cm^3

89. (1) Required ratio

$= \frac{1}{3}\pi r^2 h \;:\; \frac{2}{3}\pi r^2 h \;:\; \pi r^2 h$

$= \frac{1}{3} : \frac{2}{3} \;: 1 = 1 : 2 : 3$

90. (3) Let radius of cylinder = $3x$
radius of cone = $4x$
Also, let height of cylinder = $2y$
and height of cylinder = $3y$

$\frac{\text{Volume of the cylinder}}{\text{Volume of the cone}}$

$= \frac{\pi(3x)^2 \times 2y}{\frac{1}{3}\pi(4x)^2 \times 3y}$

$= \frac{18\pi x^2 y}{16\pi x^2 y} = 9 : 8$

91. (1) Water flowed by the pipe in 1 hour = $\pi r^2 h$

$= \frac{22}{7} \times \frac{7 \times 7}{100 \times 100} \times 5000 = 77$ m

Volume of expected water in the tank

$= \frac{50 \times 44 \times 7}{100} = 154$ m^3

$\therefore$ Required time

$= \frac{154}{77} = 2$ hours

92. (1) According to question,
$2\pi rh + 2\pi r^2 = 8\pi r^2$
$\Rightarrow 2\pi rh = 6\pi r^2$

$\Rightarrow \frac{h}{r} = 3$

$\therefore$ Required ratio

$= \pi r^2 h : \frac{4}{3}\pi r^3$

$= 3h : 4r = 9 : 4$

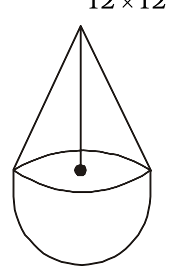
93. (2) If the height of increased water level be h cm, then

$\pi r^2 h = \frac{4}{3}\pi R^3$

$\Rightarrow 12 \times 12 \times h = \frac{4}{3} \times 6 \times 6 \times 6$

$\Rightarrow h = \frac{4 \times 2 \times 6 \times 6}{12 \times 12} = 2\text{cm}$

94. (4)



Radius of cone = 4.2cm
Height of cone = 10.2 – 4.2
= 6cm
Volume of the toy
= Volume of cone + Volume of hemisphere

$= \frac{1}{3}\pi(4.2)^2 \times 6 + \frac{2}{3}\pi(4.2)^3$

$= \frac{1}{3}\pi(4.2)^2(6 + 2 \times 4.2)$

$= \frac{1}{3} \times \frac{22}{7} \times 4.2 \times 4.2 \times 14.4$

= 266 cu.cm.

95. (3) Let Radius of hemisphere = Height of cylinder = r units

$\therefore \frac{\text{Volume of hemisphere}}{\text{Volume of cylinder}} = 1$

$\Rightarrow \frac{\frac{2}{3}\pi r^3}{\pi r_1^2 r} = 1 \Rightarrow \frac{r^2}{r_1^2} = \frac{3}{2}$

$\Rightarrow \frac{r}{r_1} = \frac{\sqrt{3}}{\sqrt{2}}$ or $\sqrt{3} : \sqrt{2}$

96. (2) $\frac{\text{Volume of the cube}}{\text{Volume of the sphere}}$

$= \frac{363}{49}$

$\Rightarrow \frac{x^3}{\frac{4}{3}\pi r^3} = \frac{363}{49}$

$\Rightarrow \frac{x^3}{r^3} = \frac{363}{49} \times \frac{4}{3} \times \frac{22}{7}$

$= \frac{121 \times 4 \times 22}{49 \times 7}$

$\Rightarrow \frac{x^3}{r^3} = \frac{11 \times 11 \times 11 \times 2 \times 2 \times 2}{7 \times 7 \times 7}$

$\therefore \frac{x}{r} = \frac{11 \times 2}{7} = \frac{22}{7}$ or $22 : 7$

97. (3) Volume of the cylinder
$= \pi r^2 h$

$= \frac{22}{7} \times 10 \times 10 \times 21$

= 6600 cu. cm
Volume of the cone
= 6600 – 4400 = 2200 cu.cm

$\therefore 2200 = \frac{1}{3}\pi \times 10^2 \times h$

$\Rightarrow 2200 = \frac{2200}{21} \times h$

$\Rightarrow h = 21$ cm.

98. (3) Volume of required water
= 2 × volume of cone
$= 2 \times 27\pi = 54\pi$ cu.cm

99. (3) Increase in water level

$= \frac{\text{Volume of sphere}}{\text{Area of base of cylinder}}$

$= \frac{\frac{4}{3}\pi r^3}{\pi r^2}$

$= \frac{4}{3}r = \frac{4}{3} \times 3.5 = \frac{14}{3}$ cm.

$\therefore$ Required water level

$= 7 - \frac{14}{3} = \frac{7}{3}$ cm.

100. (2) Volume of cylinder = $\pi r^2 h$
$\Rightarrow A = \pi r^2 (2r) = 2\pi r^3$ $[\because h = 2r]$

Volume of sphere = $\frac{4}{3}\pi r^3$

$\Rightarrow B = \frac{4}{3}\pi r^3$

$\Rightarrow \frac{A}{B} = \frac{2\pi r^3}{\frac{4}{3}\pi r^3} = \frac{6}{4} = \frac{3}{2}$

101. (2) $\frac{1}{3}\pi a^2 h = \frac{4}{3}\pi a^3$

$\Rightarrow h = 4a$

102. (2) $\frac{\text{Volume of cylinder}}{\text{Volume of cone}}$

$= \frac{\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = 3.\left(\frac{r_1}{r_2}\right)^2\left(\frac{h_1}{h_2}\right)$

$= 3 \times \left(\frac{\sqrt{3}}{\sqrt{2}}\right)^2 \times \frac{\sqrt{2}}{\sqrt{3}}$

$= 3 \times \frac{\sqrt{3}}{\sqrt{2}} = 3\sqrt{3} : \sqrt{2}$

103. (2) Let the radius of the base of cup be r cm,
$2\pi r = \pi \times 14$
$\Rightarrow r = 7$ cm
Slant height = 14 cm;

Height = $\sqrt{14^2 - 7^2}$

$= \sqrt{21 \times 7} = 7\sqrt{3}$ cm

$\therefore$ Capacity of cup = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 7\sqrt{3}$

= 622.36 cubic cm.

104. (4) Volume of water in conical flask

$= \frac{1}{3}\pi r^2 h$

If the height of water level in cylindrical flask be H units, then

$\pi m^2 r^2 H = \frac{1}{3}\pi r^2 h$

$\Rightarrow H = \frac{1}{3} \cdot \frac{\pi r^2 h}{\pi m^2 r^2} = \frac{h}{3m^2}$

105. (2) $\frac{\text{Volume of cylinder}}{\text{Volume of cone}} = \frac{3}{1}$

$\Rightarrow \frac{\pi r_1^2 h}{\frac{1}{3}\pi r_2^2 h} = \frac{3}{1} \Rightarrow r_1 = r_2$

$\therefore$ Diameter of cylinder = Diameter of cone

106. (1) Volume of cone

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 1 \times 7$

$= \frac{22}{3}$ cu.cm.

Volume of cubical block

= 10 × 5 × 2 cm^3. = 100 cm^3.

Wastage of wood

$= \left(100 - \frac{22}{3}\right) cm^3$

$= \frac{300-22}{3} = \frac{278}{3}\ cm^3$

$\therefore$ % Wastage $= \frac{\frac{278}{3}}{100} \times 100$

$= \frac{278}{3} = 92\frac{2}{3}\%$

107. (3) Required percentage decrease

$= 100 - \frac{50 \times 50 \times 150}{100 \times 100}$

= 100 – 37·5 = 62·5%

108. (1) Required per cent

$\therefore \frac{200 \times 200 \times 200}{100 \times 100} - 100$

= 800 – 100 = 700%

109. (4) Let height and radius both of a cylinder change by x%, then volume changes by

$\left[3x + \frac{3x^2}{100} + \frac{x^3}{100^2}\right]\%$

$= \left[3 \times 20 + \frac{3 \times 20 \times 20}{100} + \frac{20 \times 20 \times 20}{10000}\right]\%$

= (60 + 12 + 0.8)% = 72.8%

110. (4) Volume of original cone

$= \frac{1}{3}\pi r^2 h$

Now, r_1 = radius of new cone

$= \frac{r}{2}$

h_1 = height of new cone = $3h$

$\therefore V_1 = \frac{1}{3}\pi r_1^2 h_1 = \frac{1}{3}\pi \frac{r^2}{4} \times 3h$

$= \frac{1}{3}\pi r^2 h \times \frac{3}{4} = \frac{3}{4}V$

$\therefore$ Decrease % $= \left(\frac{V - \frac{3}{4}V}{V}\right) \times 100$

= 25%

111. (4) For original cone,

$V = \frac{1}{3}\pi r^2 h$

For the second cone,

$r_1 = 2r$

$h_1 = 2h$

$\therefore V_1 = \frac{1}{3}\pi r_1^2 h_1$

$= \frac{1}{3}\pi (2r)^2 \times 2h$

$= 8 \times \frac{1}{3}\pi r^2 h = 8\ V$

112. (2) Let the radius of a right circular cylinder is changed by x% and height is changed y%, then Volume change by

$\left(2x + y + \frac{x^2 + 2xy}{100} + \frac{x^2 y}{100^2}\right)\%$

$\therefore$ Effective change

$= \left(-2 \times 50 + 60 + \frac{2500 - 6000}{100} + \frac{150000}{10000}\right)$

= (–100 + 60 – 35 + 15)

= (75 – 135) = – 60%

Negative sign shows decrease.

113. (4) Let length, breadth and height of a cuboid are increased by x%, y% and z% respectively, then its volume is increased by

$\left(x + y + z + \frac{xy + yz + zx}{100} + \frac{xyz}{10000}\right)\%$

$\therefore$ Effective increase

$= \left(100 + 200 + 200 + 20000 + 40000 + \frac{20000}{100} + \frac{4000000}{10000}\right)\%$

= 500 + 800 + 400 = 1700%

$= 1700 \times \frac{1}{100}$ = 17 times

Method : 2

Original volume = $x \times 2x \times 3x$ = $6x^3$ cubic units

New volume = $2x \times 6x \times 9x$ = $108x^3$ cubic units

Change in volume

= $108x^3 - 6x^3$

= $102x^3$ cubic units

Increase $= \frac{102x^3}{6x^3}$ = 17 times.

114. (3) Intial area of the cylinder

= $\pi r^2 h$

Voiume of the new cylinder

= $\pi (1.1r)^2 \times 1.1h$

= $1.331\ \pi r^2 h$

$\therefore$ Increase in area

= $(1.331 - 1)\ \pi r^2 h$

= $0.331\ \pi r^2 h$

$\therefore$ Percentage increase

$= \frac{0.331\pi r^2 h}{\pi r^2 h} \times 100 = 33.1\%$

115. (1) Volume of the cone

$= \frac{1}{3}\pi r^2 h$, new height = 100%h

$\therefore$ Percentage increase in volume = 100%

116. (1) Volume of the hemispherical cup $= \frac{2}{3}\pi r^3$

$= \frac{2}{3}\pi \times 4 \times 4 \times 4$

$= \frac{128\pi}{3}$ cu.cm.

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi \times 8 \times 8 \times 16$

$= \frac{128 \times 8\pi}{3}$ cu.cm.

Part filled $= \frac{1}{8}$

$\therefore$ Part remaining empty

$= \frac{7}{8} = 87.5\%$

117. (2) 1 hectare = 10000 sq.metre then Area of the ground = 15000 sq.metre

$\therefore$ Required volume

$= 15000 \times \frac{5}{100}$

= 750 cubic metre

118. (1) Area of the tetrahedron

$= \frac{1}{3} \times$ area of base × height

Area of the base

$= \frac{\sqrt{3}}{4} \times (\text{side})^2$

$= \frac{\sqrt{3}}{4} \times 3 \times 3 = \frac{9\sqrt{3}}{4}$ cm²

Now, length of the perpendicular in the equilateral triangle

$= \sqrt{3^2 - \left(\frac{3}{2}\right)^2}$

$= \sqrt{9 - \frac{9}{4}} = \frac{3\sqrt{3}}{2}$ cm

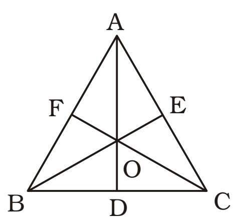
$\therefore$ Height $= \sqrt{\left(\frac{3\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2}$

$= \sqrt{\frac{27}{4} - \frac{3}{4}} = \sqrt{6}$ cm

$\therefore$ Required area $= \frac{1}{3} \times \frac{9\sqrt{3}}{4} \times \sqrt{6}$

$= \frac{9\sqrt{2}}{4}$ cu.cm.

119. (4)



Radius of the in-circle = OE = OD = OF = 3 cm

Area of triangular base

$= \left(\frac{1}{2}\text{AB} \times \text{OF} + \frac{1}{2} \times \text{BC} \times \text{OD} + \frac{1}{2} \times \text{AC} \times \text{OE}\right)$

$= \frac{1}{2} \times 3 \times (\text{AB} + \text{BC} + \text{AC})$

$= \frac{1}{2} \times 3 \times 15 = \frac{45}{2}$ sq. cm.

Volume of the prism

= Area of the base × height

$\Rightarrow 270 = \frac{45}{2} \times$ height

$\therefore$ Height $= \frac{270 \times 2}{45} = 12$ cm.

120. (2) Area of the base of prism

$= \frac{1}{2} \times 10 \times 12 = 60$ sq. cm.

$\therefore$ Volume of prism = Area of the base × height = 60 × 20

=1200 cu.cm

$\therefore$ Mass of prism

= Volume × density

= (1200 × 6) gm

$= \left(\frac{1200 \times 6}{1000}\right)$ kg. = 7.2 kg.

121. (2) Let the radius of wire

= r cm.

Volume of copper rod

$= \pi \times \left(\frac{1}{2}\right)^2 \times 8 = 2\pi$ cm³

Volume of wire $= \pi r^2 \times 1800$

$= 1800\ \pi r^2$ cm³

Clearly,

$1800\pi r^2 = 2\pi$

$\Rightarrow r^2 = \frac{1}{900} \Rightarrow r = \frac{1}{30}$

122. (3) Radius of the base of well

$= \frac{20}{2} = 10$m

Volume of the earth taken out

$= \pi r^2 h = \frac{22}{7} \times 10^2 \times 14 \text{m}^3$

Let the height of embankment be x metres.

Then,

Volume $= \pi (R^2 - r^2) \times x$, where R = 15 m, $r = 10m$

$= \frac{22}{7}(15^2 - 10^2) \times x$

$= \frac{22}{7} \times 25 \times 5 \times x$

Clearly,

$\frac{22}{7} \times 25 \times 5 \times x$

$= \frac{22}{7} \times 10^2 \times 14$

$\Rightarrow x = \frac{100 \times 14}{25 \times 5} = 11.2$ m

123. (2) Sum of the volume of two cylinders

$= \pi r_1^2 h_1 + \pi r_2^2 h_2$

$= \frac{22}{7}$ (4 × 4 × 6 + 5 × 5 × 4)

$= \frac{22}{7}$ (96 + 100)

$= \frac{22}{7} \times 196 = 616$ cm³

Let the radius of the disc be r cm.

$\therefore\ \pi r^2 \times 1 = 616$

$\Rightarrow \frac{22}{7} \times r^2 = 616$

$\Rightarrow r^2 = \frac{616 \times 7}{22} = 196$

$\Rightarrow r = \sqrt{196} = 14$ cm

124. (1) When we change shape of a solid figure, volume remains constant

$\therefore$ Volume of hemisphere

= Volume of cone

$\Rightarrow \frac{2}{3}\pi R^3 = \frac{1}{3}\pi R^2 H \quad \therefore 2R = H$

125. (4) According to the question, three solid metallic spheres are melted and recast into a new solid sphere. It means that the volume of new solid sphere will be equal to the sum of volume of three solid spheres.

$\therefore$ Volume of new solid sphere

$= \frac{4}{3}\pi\left(\frac{6}{2}\right)^3 + \frac{4}{3}\pi\left(\frac{8}{2}\right)^3 + \frac{4}{3}\pi\left(\frac{10}{2}\right)^3$

$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left[(3)^3 + (4)^3 + (5)^3\right]$

$\Rightarrow r^3 = 27 + 64 + 125$

$\Rightarrow r^3 = 216$

$\Rightarrow r^3 = (6)^3$

$\Rightarrow$ r = 6 cm

$\therefore$ Diameter of the new sphere

= 2 × 6 = 12 cm

126. (4) Let the radius of new ball

= R cm

then $\frac{4}{3}\pi R^3 = \frac{4}{3}\pi\left(3^3 + 4^3 + 5^3\right)$

$R^3 = 27 + 64 + 125 = 216$

$\Rightarrow R = \sqrt[3]{6 \times 6 \times 6} = 6$ cm

127. (4) $\frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi (1)^3 + \frac{4}{3}\pi (6)^3 + \frac{4}{3}\pi(8)^3$

$\Rightarrow \frac{4}{3}\pi r^3 = \frac{4}{3}\pi (1 + 216 + 512)$

$\Rightarrow r^3 = 729 \Rightarrow r = \sqrt[3]{729}$

$\Rightarrow r = 9$ cm

128. (3) According to question
Volume of sphere = Volume of displaced water

$\Rightarrow \frac{4}{3}\pi \times 2 \times 2 \times 2 = \pi \times 4 \times 4 \times h$

$\therefore h = \frac{2}{3}$ cm

129. (2) Volume of cylinder
$= \pi r^2 h = \pi \times (8)^2 \times 2 = 128\pi$ cm^3
Let the radius of each sphere be r cm.

$\therefore 12 \times \frac{4}{3}\pi r^3 = 128\pi$

$\Rightarrow 16\pi r^3 = 128\pi$

$\Rightarrow r^3 = \frac{128\pi}{16\pi}$

$\Rightarrow r = \sqrt[3]{8} = 2$ cm

$\therefore$ Diameter = 2 × 2 = 4cm

130. (1) Volume of original sphere

$= \frac{4}{3}\pi (6)^3 = 288\pi$ cm^3

Let the radii of small spheres be $3x$, $4x$ and $5x$ cm respectively

$\therefore \frac{4}{3}\pi\left[(3x)^3 + (4x)^3 + (5x)^3\right]$

$= 288\pi$

$\Rightarrow \frac{4}{3}\pi (27x^3 + 64x^3 + 125x^3)$

$= 288\pi$

$\Rightarrow \frac{4}{3}\pi \times 216x^3 = 288\pi$

$\Rightarrow x^3 = \frac{288\pi \times 3}{4\pi \times 216} = 1$

$\Rightarrow x = 1$

$\therefore$ Required radius
= 3 × 1 = 3cm.

131. (3) Volume of solid sphere

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi (0.3)^3$ cubic metre

If the radius of the circular sheet be R, then
Volume of the sheet
$= \pi R^2 \times 0.001$

$= \frac{4}{3}\pi (0.3)^3$

$R^2 \times 0.001 = \frac{4}{3} \times 0.3 \times 0.3 \times 0.3$

$R^2 = 36 \Rightarrow R = 6$ metres

$\therefore$ Diameter = 12 metres

132. (2) Volume of the wire $= \pi r^2 h$
$= \pi \times 0.1 \times 0.1 \times 3600$ cm^3
$= 36\pi$ cm^3

Volume of the sphere $= \frac{4}{3}\pi R^3$

$= 36\pi$

$\Rightarrow R^3 = \frac{36 \times 3}{4} = 27$

$\therefore R = \sqrt[3]{27} = 3$ cm

133. (1) Volume of the cone $= \frac{1}{3}\pi r^2 h$

$= \frac{\pi}{3} \times 6 \times 6 \times 24$ cm^3

= Volume of the sphere
If the radius of the sphere be r cm, then

$\frac{4}{3}\pi r^3 = \frac{\pi}{3} \times 6 \times 6 \times 24$

$\Rightarrow r^3 = 6 \times 6 \times 6$

$\therefore r = \sqrt{6 \times 6 \times 6} = 6$ cm.

134. (4) Radius of ball = 3 cm
Volume of the metallic spherical ball

$= \frac{4}{3} \times \pi \times (3)^3 = 36\pi$ cm^3.

Let h be the height of the cone.
Volume of cone = Volume of ball

$\Rightarrow \frac{1}{3}\pi \times 6 \times 6 \times h = 36\pi$

$\Rightarrow h = \frac{36\pi \times 3}{\pi \times 6 \times 6} = 3$ cm

135. (2) Radius of the iron ball $= \frac{14}{2}$

= 7 cm
Volume of the ball

$= \frac{4}{3}\pi \times (7)^3$ cm^3.

Let the radius of cylinder be r cm.
$\therefore$ Volume of cylinder

$= \pi r^2 \times \frac{7}{3}$ cm^3

Clearly,

$\pi r^2 \times \frac{7}{3} = \frac{4}{3}\pi \times (7)^3$

$\Rightarrow r^2 = \frac{4 \times 7 \times 7 \times 7 \times 3}{7 \times 3}$

$\Rightarrow r = \sqrt{4 \times 7 \times 7} = 14$ cm

$\therefore$ Diameter = 2 × 14
= 28 cm

136. (3) Volume of the cylinder
$= \pi r^2 \times h$
$= \pi r^2 \times 6$
$= 6\pi r^2$ cm^3
Let the height of the cone be h cm.

$\therefore$ Volume of the cone $= \frac{1}{3}\pi r^2 h$

According to the question,
Volume of the cone = Volume of the cylinder

$\Rightarrow \frac{1}{3}\pi r^2 h = 6\pi r^2$

$\Rightarrow h = 18$ cm.

137. (2) Volume of the cone =
Volume of the cylinder

$\Rightarrow \frac{1}{3}\pi r^2 h_1 = \pi r^2 h_2$

$\Rightarrow h_1 = 3h_2 = 3 \times 7 = 21$ cm.

138. (4) Volume of the solid sphere

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 7 \times 7 \times 7$ cu. cm.

If the length of wire (cylindrical) be h cm, then

$\pi R^2 h = \frac{4}{3} \times \pi \times 7 \times 7 \times 7$

$\Rightarrow 7 \times 7 \times h = \frac{4}{3} \times 7 \times 7 \times 7$

$\Rightarrow h = \frac{28}{3}$ cm

139. (4) In this case volume remains same.

$\therefore \frac{4}{3}\pi R^3 = \frac{1}{3}\pi R^2 H$

$\Rightarrow 4R = H$
$\Rightarrow H : R = 4 : 1$

140. (2) Volume of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 3 \times 3 \times 3$

$= 36\pi$ cu. cm.

If the water level rises by h cm, then

$\pi R^2 h = 36\pi$
$\Rightarrow 6 \times 6 \times h = 36$
$\Rightarrow h = 1$ cm

141. (2) Volume of sphere

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 9 \times 9 \times 9$

$= 972\ \pi$ cubic.cm.

If the length of wire be h cm., then

$\pi \times (0.2)^2 \times h = 972\ \pi$

$\Rightarrow h = \frac{972}{0.2 \times 0.2} = 24300$ cm

or 243 metres

142. (1) Volume of block

$= 21 \times 77 \times 24$ cu. cm.

Let the radius of sphere be r cm, then

$\frac{4}{3}\pi r^3 = 21 \times 77 \times 24$

$\Rightarrow r^3 = \frac{21 \times 77 \times 24 \times 3 \times 7}{4 \times 22}$

$= 21 \times 7 \times 3 \times 3 \times 7$

$= 3^3 \times 7^3$

$\Rightarrow r = 3 \times 7 = 21$ cm

143. (4) Let Length of rod $= x$ cm

$\therefore$ Volume of cylinder = Volume of 6 spheres

$\Rightarrow \pi r^2 h = 6 \times \frac{4}{3}\pi r^3$

$\Rightarrow h = 6 \times \frac{4}{3} \times r = 8 \times 50$

$= 400$ cm $= 4$ metres

144. (2) Volume of cone = Volume of sphere

$\Rightarrow \frac{1}{3}\pi r_1^2 h + \frac{1}{3}\pi r_2^2 h = \frac{4}{3}\pi r^3$

$\Rightarrow \left(r_1^2 + r_2^2\right)h = 4r^3$

$\Rightarrow (9 + 16)h = 4 \times 5^3$

$\Rightarrow 25h = 4 \times 125$

$\Rightarrow h = 4 \times 5 = 20$ cm

145. (3) Volume of earth taken out

$= 40 \times 30 \times 12$

$= 14400$ cu.metre

Area of the rectangular field

$= 1000 \times 30 = 30000$ sq. metre

Area of the region of tank

$= 40 \times 30 = 1200$ sq. metre

Remaining area

$= 30000 - 1200$

$= 28800$ sq. metre

Increase in level

$= \frac{14400}{28800} = 0.5$ metre

146. (4) Area of the base of pyramid

$= \frac{1}{2} \times (\text{diagonal})^2$

$= \frac{1}{2} \times 1152 = 576$ sq.metre

Volume of pyramid $= \frac{1}{3} \times$ Area of base $\times$ Height

$= \frac{1}{3} \times 576 \times 6 = 1152$ cu.metre

147. (1) $\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$

$\Rightarrow \frac{2}{3} = \left(\frac{1}{2}\right)^2 \times \frac{h_1}{h_2}$

$\Rightarrow \frac{h_1}{h_2} = \frac{2}{3} \times 4 = \frac{8}{3} = 8 : 3$

148. (3) Edges of cubes = x and y units (let)

$\therefore$ Ratio of volumes $= \frac{x^3}{y^3}$

$\therefore \frac{x^3}{y^3} = \frac{27}{64} \Rightarrow \frac{x}{y} = \frac{3}{4}$

$\therefore$ Raito of surface areas $= \frac{6x^2}{6y^2}$

$= \frac{x^2}{y^2} = \left(\frac{3}{4}\right)^2 = \frac{9}{16}$

149. (1) Volume of a cone $= \frac{1}{3}\pi r^2 h$

Again, $r_1 = 2r$, $h_1 = 2h$

$\therefore$ Volume of the second cone

$= \frac{1}{3}\pi r_1^2 h_1$

$= \frac{1}{3}\pi (2r)^2 \times 2h$

$= \frac{1}{3}\pi r^2 h \times 8$

= Eight times of the previous volume

150. (1) Ratio of the volumes of spheres

$= \frac{8 \times 64}{289 \times 17}$

$\Rightarrow \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{8 \times 8 \times 8}{17 \times 17 \times 17}$

$\Rightarrow \frac{r_1^3}{r_2^3} = \left(\frac{8}{17}\right)^3$

$\Rightarrow \frac{r_1}{r_2} = \frac{8}{17}$

151. (1) Volume of the new cube

$= [(6)^3 + (8)^3 + (1)^3]$ cu.cm.

$= (216 + 512 + 1)$ cu.cm.

$= 729$ cu.cm.

Edge of new cube $= \sqrt[3]{729}$

$= 9$ cm

Its surface area $= 6 \times (\text{edge})^2$

$= 6 \times 9 \times 9 = 486$ sq. cm.

152. (1) Volume of conical vessel

$= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 6 \times 6 \times 12$

$= 144\ \pi$ cu. cm.

If the radius of sphere be R cm, then

$8 \times \frac{2}{3}\pi R^3 = 144\pi$

$\Rightarrow R^3 = \frac{144 \times 3}{8 \times 2}$

$= 9 \times 3 = 3 \times 3 \times 3$

$\therefore R = \sqrt[3]{3 \times 3 \times 3} = 3$ cm.

153. (4) Radius of cylinder $= r$ units

Radius of sphere $= \frac{r}{2}$ units

Let the height of cylinder be h units,

$\therefore$ Volume of cylinder = Volume of sphere

$\Rightarrow \pi r^2 h = \frac{4}{3}\pi \left(\frac{r}{2}\right)^3$

$\Rightarrow \pi r^2 h = \frac{1}{6}\pi r^3$

$\Rightarrow h = \frac{1}{6} r$

$\Rightarrow \frac{h}{r} = \frac{1}{6}$

154. (2) Volume of pile = 20 cu. metre

$= 20 \times (100)^3$ cu.cm.

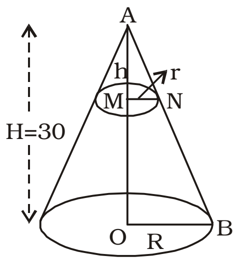
Volume of one brick

$= (25 \times 12.5 \times 8)$ cu.cm.

$\therefore$ Required number of bricks

$= \frac{20 \times 100 \times 100 \times 100}{25 \times 12.5 \times 8} = 8000$

155. (2) Let H and R be the height and radius of bigger cone respectively and h and r that of smaller cone.



From triangles AOB and AMN.
$\angle$A is common and MN | | OB.
$\therefore$ Triangles AOB and AMN are similar,

$\therefore \dfrac{AO}{AM} = \dfrac{BO}{MN}$

$\Rightarrow \dfrac{30}{h} = \dfrac{R}{r}$ ...(*i*)

Volume of smaller cone

$= \dfrac{1}{3}\pi r^2 h$

Volume of bigger cone

$= \dfrac{1}{3}\pi R^2 H$

$\therefore$ According to the question,

$\dfrac{1}{3}\pi r^2 h = \left(\dfrac{1}{3}\pi R^2 H\right) \times \dfrac{1}{27}$

$\Rightarrow r^2 h = \dfrac{R^2 H}{27}$

$\Rightarrow 27r^2 h = R^2 H$

$\Rightarrow \dfrac{27h}{H} = \dfrac{R^2}{r^2}$

$\Rightarrow \dfrac{27h}{H} = \left(\dfrac{30}{h}\right)^2$ ...[From (i)]

$\Rightarrow \dfrac{27h}{H} = \dfrac{900}{h^2}$

$\Rightarrow 27h^3 = 900H = 900 \times 30$

$\Rightarrow h^3 = \dfrac{900 \times 30}{27} = 1000$

$\Rightarrow h = \sqrt[3]{1000} = 10$ cm

$\therefore$ Required height = 30 – 10 = 20 cm

156. (1) Volume of pyramid

$= \dfrac{1}{3} \times$ area of base $\times$ height

$\Rightarrow 500 = \dfrac{1}{3} \times 30 \times h$

$\Rightarrow 10h = 500$

$\Rightarrow h = \dfrac{500}{10} = 50$ metre

157. (1) Lateral surface area of prism

$= 3 \times$ side $\times$ height

$\therefore 3 \times$ side $\times$ height $= 120$

$\Rightarrow$ Side $\times$ height $= \dfrac{120}{3}$

= 40 sq.cm. ...(i)

Volume of prism = Area of base $\times$ height

$\Rightarrow 40\sqrt{3} = \dfrac{\sqrt{3}}{4} \times \text{side}^2 \times \text{height}$

$\Rightarrow \dfrac{40\sqrt{3} \times 4}{\sqrt{3}} = \text{side}^2 \times \text{height}$

$\Rightarrow \text{side}^2 \times \text{height}$

= 160 cu.cm ...(ii)

Dividing equation (ii) by (i),

Side $= \dfrac{160}{40} = 4$ cm.

158. (4) Volume of lead

$= \dfrac{4}{3}\pi r^3 = \dfrac{4}{3}\pi \times 2^3$

If the thickness of gold be x cm, then

Volume of gold

$= \dfrac{4}{3}\pi\left((2+x)^3 - 2^3\right)$ cu.cm

$\therefore \dfrac{4}{3}\pi\left((2+x)^3 - 2^3\right)$

$= \dfrac{4}{3}\pi \times 2^3$

$\Rightarrow (2 + x)^3 - 2^3 = 2^3$

$\Rightarrow (2 + x)^3 = 8 + 8 = 16$

$\Rightarrow (2 + x)^3 = 2^3.2$

$\Rightarrow 2 + x = 2 \times \sqrt[3]{2}$

$\Rightarrow 2 + x = 2 \times 1.259 = 2.518$

$\therefore x = 2.518 - 2 = 0.518$ cm

159. (4) Radius of larger sphere = R units

$\therefore$ Its volume $= \dfrac{4}{3}\pi R^3$ cu. units

Volume of smaller cone

$= \dfrac{1}{3}\pi R^3$ cubic units

Volume of smaller sphere

$= \dfrac{1}{3}\pi R^3$

$\therefore \dfrac{4}{3}\pi r^3 = \dfrac{1}{3}\pi R^3$

$\Rightarrow r^3 = \dfrac{R^3}{4}$

$\Rightarrow r = \dfrac{R}{\sqrt[3]{4}}$

$\therefore$ Surface area of smaller sphere : Surface area of larger sphere

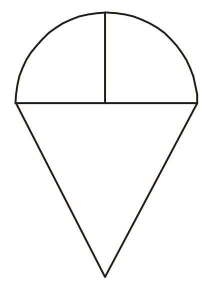
$= 4\pi r^2 : 4\pi R^2$

$= r^2 : R^2$

$= \left(\dfrac{R}{\sqrt[3]{4}}\right)^2 : R^2 = 1 : \left(\sqrt[3]{4}\right)^2$

$= 1 : \left((2^2)^{\frac{1}{3}}\right)^2 = 1 : 2^{\frac{4}{3}}$

160. (1)



Volume of hemisphere $= \dfrac{2}{3}\pi r^3$,

Where r = radius = 7 cm.

$= \left(\dfrac{2}{3} \times \dfrac{22}{7} \times 7 \times 7 \times 7\right)$ cu.cm.

Volume of conical part

$= \dfrac{1}{3}\pi r^2 h$

$[\because r = h]$

$= \left(\dfrac{1}{3} \times \dfrac{22}{7} \times 7 \times 7 \times 7\right)$ cu.cm.

$\therefore$ Volume of ice-cream

$= \dfrac{2}{3} \times \dfrac{22}{7} \times 7^3 + \dfrac{1}{3} \times \dfrac{22}{7} \times 7^3$

$= \dfrac{22}{7} \times 7^3 = 22 \times 7^2$

= 1078 cu.cm.

161. (3) Volume of material of hollow sphere $= \dfrac{4}{3}\pi\left(r_1^3 - r_2^3\right)$

$= \dfrac{4}{3} \times \pi\left(5^3 - 3^3\right)$

$= \dfrac{4}{3} \times \pi \times (125 - 27)$

$= \dfrac{4}{3} \times \pi \times 98$ cu.cm.

Volume of cone = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 4^2 \times h$

$\therefore \frac{1}{3}\pi \times 16 \times h = \frac{4}{3} \times \pi \times 98$

$\Rightarrow 4h = 98$

$\Rightarrow h = \frac{98}{4} = 24.5$ cm

162. (3) Volume of the tetrahedron

$= \frac{a^3}{6\sqrt{2}}$, where a = edge = 4 cm

$= \frac{4 \times 4 \times 4}{6\sqrt{2}} = \frac{16\sqrt{2}}{3}$ cu.cm.

163. (4) Radius of the base of conical shape = r cm (let)

Radius of base of cylinder

$= \frac{r}{3}$ cm

Volume of water = Volume of cone

$= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi r^2 \times 24$

$= 8\pi r^2$ cu. cm.

$\therefore$ Volume of cylinder = $\pi R^2 H$

$= \pi \times \left(\frac{r}{3}\right)^2 H = \frac{\pi r^2 H}{9}$ cu. cm.

$\therefore \frac{\pi r^2 H}{9} = 8\pi r^2$

$\Rightarrow H = 9 \times 8 = 72$ cm

164. (1) Edge of cube = a cm (let)

$\therefore$ Its total surface area = $6a^2$

$\therefore 6a^2 = 150$

$\Rightarrow a^2 = \frac{150}{6} = 25$

$\Rightarrow a = \sqrt{25} = 5$ cm

$\therefore$ Volume of cube = a^3

= (5 × 5 × 5) cu.cm

= 125 cu.cm

165. (2) Volume of metallic sphere

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \pi \times 3 \times 3 \times 3$

$= 36\pi$ cu.cm.

$\therefore$ Volume of cone

$= 36\pi$ cu.cm.

$\Rightarrow \frac{1}{3}\pi R^2 h = 36\pi$

$\Rightarrow R^2 h = 108$

$\Rightarrow 6 \times 6 \times h = 108$

$\Rightarrow h = \frac{108}{6 \times 6} = 3$ cm.

166. (4) Volume of hemi-spherical bowl

$= \frac{2}{3}\pi r^3$

$= \left(\frac{2}{3} \times \pi \times 15 \times 15 \times 15\right)$ cu.cm

Volume of a bottle = $\pi R^2 h$

$= \pi \times \frac{5}{2} \times \frac{5}{2} \times 6$ cu.cm

$\therefore$ Number of bottles

$= \frac{2 \times \pi \times 15 \times 15 \times 15}{3 \times \pi \times \frac{5}{2} \times \frac{5}{2} \times 6} = 60$

167. (*) Volume of cone

$= V_1 = \frac{1}{3}\pi r^2 h$

$= \frac{\pi}{3} r^3$ ($\because h = r$)

Volume of sphere = $V_2 = \frac{4}{3}\pi r^3$

Volume of cylinder = $V_3 = \pi r^2 h$
$= \pi r^3$

$\therefore V_1 : V_2 : V_3 = \frac{1}{3} : \frac{4}{3} : 1$

= 1 : 4 : 3

$\therefore V_1 = \frac{V_2}{4} = \frac{V_3}{3}$

168. (2) Volume of sphere

$= \frac{4}{3}\pi r^3$ cu. units

Case II,
R = $2r$ units

$\therefore$ Volume of sphere = $\frac{4}{3}\pi R^3$

$= \frac{4}{3}\pi (2r)^3$

$= \frac{32}{3}\pi r^3$ cu. units

Difference = $\frac{32}{3}\pi r^3 - \frac{4}{3}\pi r^3$

$= \frac{28}{3}\pi r^3$

$\therefore$ Percentage increase

$= \frac{\frac{28}{3}\pi r^3}{\frac{4}{3}\pi r^3} \times 100$

= 700%

$\boxed{\text{OR}}$

Single equivalent per cent increase for increases of 100% and 100%

$= \left(100 + 100 + \frac{100 \times 100}{100}\right)\%$

= 300%

Single equivalent per cent increase for increases of 300% and 100%

$= \left(300 + 100 + \frac{300 \times 100}{100}\right)\%$

= 700%

169. (4) Volume of tank = $(1.2)^3$ cubic metre

= 1.728 cubic metre

$\therefore$ 64 × Volume of 1 bucket

$= \frac{2 \times 1.728}{3}$ cubic metre

$\therefore$ Volume of 1 bucket

$= \left(\frac{1.728 \times 2}{3 \times 64}\right)$ cubic metre

= 0.018 cubic metre

= (0.018 × 1000) litres

= 18 litres

170. (4) Volume of wooden box

= (8 × 7 × 6) cu.m.

= (8 × 7 × 6 × 100^3) cu.cm.

Volume of a box

= (8 × 7× 6) cu.cm.

$\therefore$ Maximum number of boxes

$= \frac{8 \times 7 \times 6 \times 100^3}{8 \times 7 \times 6}$

= 1000000

171. (3) $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\Rightarrow \left(\frac{r_1}{r_2}\right)^2 = \frac{h_2}{h_1} = \frac{2}{1}$

$\therefore \frac{r_1}{r_2} = \frac{\sqrt{2}}{1} = \sqrt{2} : 1$

172. (3) Paper is folded along the length.

$\therefore$ Circumference of the base

= 22 cm,

Height of cylinder = 12 cm

$\therefore\ 2\pi r = 22$

$\Rightarrow\ 2 \times \frac{22}{7} \times r = 22$

$\Rightarrow r = \frac{7}{2}$ cm

$\therefore$ Volume of cylinder

$= \pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12$

= 462 cu.cm.

173. (1) Height of cylinder

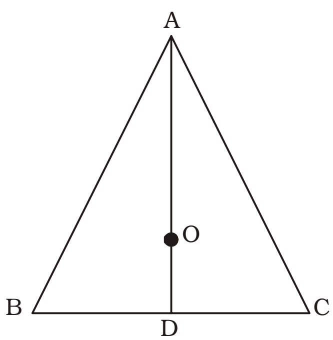
= 2 R units

Radius of base = R units

$\therefore$ Volume of cylinder $= \pi R^2 h$

$\Rightarrow \pi (R)^2 (2R) = 2\pi R^3$

174. (*)



Area of the base of pyramid

$= \frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 4 \times 4 = 4\sqrt{3}$ sq. cm.

Length of median on the base (AD)

$= \sqrt{4^2 - 2^2} = \sqrt{12} = 2\sqrt{3}$ cm

$\therefore$ OD $= \frac{1}{3} \times 2\sqrt{3} = \frac{2}{\sqrt{3}}$ cm

Height of pyramid

$= \sqrt{5^2 - \left(\frac{2}{\sqrt{3}}\right)^2}$

$= \sqrt{25 - \frac{4}{3}} = \frac{\sqrt{71}}{\sqrt{3}}$ cm

$\therefore$ Volume of pyramid

$= \frac{1}{3} \times$ area of base $\times$ height

$= \frac{1}{3} \times 4\sqrt{3} \times \frac{\sqrt{71}}{\sqrt{3}}$

$= \frac{4\sqrt{71}}{3}$ cu.cm.

175. (1) Curved surface area of cone = 550 sq. cm.

$\Rightarrow \pi r l = 550$

$\Rightarrow \frac{22}{7} \times 7 \times \sqrt{r^2 + h^2} = 550$

$\Rightarrow \frac{22}{7} \times 7 \times \sqrt{49 + h^2} = 550$

$\Rightarrow \sqrt{49 + h^2} = \frac{550}{22} = 25$

$\Rightarrow 49 + h^2 = (25)^2 = 625$

$\Rightarrow h^2 = 625 - 49 = 576$

$\Rightarrow h = \sqrt{576} = 24$ cm.

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24$

= 1232 cu. cm.

176. (1) Volume of cylinder $= \pi r^2 h = (\pi \times 9^2 \times 162)$ cu.cm.

$\therefore$ Volume of hemisphere

$= (\pi \times 9^2 \times 162)$ cu. cm.

$\therefore \frac{2}{3}\pi \times R^3 = \pi \times 9^2 \times 162$

$\Rightarrow R^3 = \frac{9^2 \times 162 \times 3}{2}$

$= 9^2 \times 81 \times 3$

$\therefore R = \sqrt[3]{9^2 \times 9^2 \times 3}$

$= 9 \times 3 = 27$ cm.

177. (1) Volume of iron sphere

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 27 \times 27 \times 27$

$= (36 \times 27 \times 27)\pi$ cu. cm.

$\therefore$ If the radius of wire be R cm., then

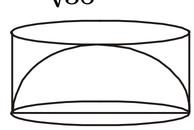
$\pi \times R^2 \times 729 = 36 \times 27 \times 27\ \pi$

$[\because V = \pi R^2 H]$

$\Rightarrow R^2 = \frac{36 \times 27 \times 27}{729} = 36$

$\therefore R = \sqrt{36} = 6$ cm.

178. (4)



Radius of cylinder = radius of hemisphere

= r units

$\therefore$ Required ratio

$= \pi r^2 . r : \frac{2}{3}\pi r^3$

= 3 : 2

179. (1) Ratio of the volumes of cubes

$= \frac{8}{125}$

$\Rightarrow \frac{l_1^3}{l_2^3} = \frac{8}{125} \Rightarrow \frac{l_1}{l_2} = \frac{2}{5}$

$\therefore$ Ratio of their total surface areas $= \frac{6l_1^2}{6l_2^2} = \frac{l_1^2}{l_2^2} = \frac{4}{25}$

180. (1) Volume of water

$= \frac{4}{3}\pi r^3 + \frac{1}{4} \times \frac{4}{3}\pi r^3$

$= \frac{5}{3}\pi r^3 = \frac{5}{3}\pi$ cube cm.

181. (3) Volume of one drop of water

$= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \pi \times \left(\frac{1}{20}\right)^3$ cube cm.

$\therefore$ Volume of 32000 drops of water

$= \frac{4\pi}{3} \times \frac{32000}{20 \times 20 \times 20}$ cubic cm.

$= \frac{16\pi}{3}$ cubic cm.

$\therefore$ Volume of glass $= \frac{1}{3}\pi R^2 H$

Here, $R = \frac{H}{2}$

$\therefore \frac{1}{3}\pi \left(\frac{H}{2}\right)^2 . H = \frac{16\pi}{3}$

$\Rightarrow \frac{H^3}{4} = 16$

$\Rightarrow H^3 = 64$

$\therefore H = \sqrt[3]{64} = 4$ cm.

182. (3) If the radius of base of cylinder be r units, then,

Height $= 4 \times 2\pi r$

$= 8\pi r$ units

$\therefore 2\pi r = c$

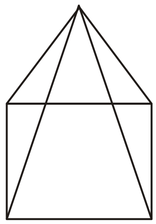
$\therefore r = \frac{c}{2\pi}$ and $h = 4c$

$\therefore$ Volume of cylinder $= \pi r^2 h$

$= \frac{\pi c^2}{4\pi^2} \times 4c$

$= \frac{c^3}{\pi}$ cubic units

183. (2)



Volume of pyramid

$= \frac{1}{3} \times$ area of base $\times$ height

$\Rightarrow 1296 = \frac{1}{3} \times 324 \times h$

$\Rightarrow h = \frac{1296 \times 3}{324} = 12$ metre

$\therefore$ Side of square base $= \sqrt{324}$

= 18 metre

$\therefore$ Slant height $= \sqrt{12^2 + \left(\frac{18}{2}\right)^2}$

$= \sqrt{12^2 + 9^2}$

$= \sqrt{144 + 81}$

$= \sqrt{225} = 15$ metre

$\therefore$ Area of the lateral surfaces

$= \frac{1}{2} \times$ perimeter of base $\times$ slant height

$= \frac{1}{2} \times 4 \times 18 \times 15$

= 540 sq.metre.

184. (2) Radii of spheres = r_1 and r_2 units

According to the question

$\frac{4\pi r_1^2}{4\pi r_2^2} = \frac{9}{16}$

$\Rightarrow \frac{r_1^2}{r_2^2} = \frac{9}{16}$

$\Rightarrow \frac{r_1}{r_2} = \sqrt{\frac{9}{16}} = \frac{3}{4}$

$\therefore$ Ratio of their volumes

$= \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3}$

$= \left(\frac{r_1}{r_2}\right)^3 = \left(\frac{3}{4}\right)^3 = \frac{27}{64}$

185. (4) Volume of cylinder $= \pi r^2 h$

$= (\pi \times 20 \times 20 \times 9)$ cu.cm.

= 3600 π cu.cm.

$\therefore$ Volume of cone

= 3600 π cu.cm.

$\Rightarrow \frac{1}{3} \pi R^2 H = 3600 \pi$

$\Rightarrow \frac{1}{3} \times R^2 \times 108 = 3600$

$\Rightarrow R^2 = \frac{3600 \times 3}{108} = 100$

$\Rightarrow R = \sqrt{100} = 10$ cm.

186. (4) Radius of the base of the cylinder = radius of the base of cone = x units

$\frac{\text{Volume of cone}}{\text{Volume of cylinder}}$

$= \frac{\frac{1}{3}\pi r^2 H}{\pi r^2 h}$

$= \frac{1}{3} \cdot \frac{H}{h} = \frac{1}{3} \times \frac{2}{3} = 2 : 9$

187. (3) Ratio of volumes

= cone : cylinder : hemi-sphere

$= \frac{1}{3}\pi r^2 h : \pi r^2 h : \frac{2}{3} \pi r^3$

$= \frac{1}{3}\pi r^3 : \pi r^3 : \frac{2}{3}\pi r^3$

$[\because r = h]$

$= \frac{1}{3} : 1 : \frac{2}{3} = 1 : 3 : 2$

188. (2) Volume of the material of the hollow cylinder

$= \frac{4}{3}\pi (R^3 - r^3)$

$= \frac{4}{3}\pi (5^3 - 3^3)$

$= \frac{4}{3}\pi (125 - 27)$

$= \frac{4 \times 98}{3} \pi$ cu.cm.

If the radius of the cylinder be R cm, then

$\pi R^2 \times \frac{8}{3} = \frac{4 \times 98\pi}{3}$

$\Rightarrow R^2 = \frac{4 \times 98}{8} = 49$

$\Rightarrow R = \sqrt{49} = 7$ cm.

$\therefore$ Diameter = 2 R = 2 × 7

= 14 cm.

189. (1) According to the question,

$\pi (R^2 - r^2)\, h = 748$

$\Rightarrow \frac{22}{7} (R^2 - r^2) \times 14 = 748$

$\Rightarrow R^2 - r^2 = \frac{748 \times 7}{22 \times 14} = 17$

$\Rightarrow 9^2 - r^2 = 17 \Rightarrow 81 - r^2 = 17$

$\Rightarrow r^2 = 81 - 17 = 64$

$\Rightarrow r = \sqrt{64} = 8$ cm.

$\therefore$ Thickness of pipe

$= R - r = 9 - 8 = 1$ cm.

190. (3) Volume of the two spheres of radius 6 cm. each

$= 2 \times \frac{4}{3} \pi r^3$

$= 2 \times \frac{4}{3} \times \pi \times (6)^3$

= 576 π cu. cm.

According to the question,

$\pi \times 12 \times 12 \times h = 576 \pi$

$\Rightarrow h = \frac{576}{12 \times 12} = 4$ cm.

191. (3) Perimeter of a face of cube

= 20 cm.

$\therefore$ An edge of cube

$= \frac{20}{4} = 5$ cm.

$\therefore$ Volume of cube = (edge)^3

$= (5)^3 = 125$ cu. cm.

192. (1) Radius of sphere = r units

According to the question,

$\frac{4}{3} \pi r^3 = 4 \pi r^2 \Rightarrow r = 3$ units

$\therefore$ Diameter = 2 × 3 = 6 units

193. (4) Radius of cylindrical vessel = r cm. (let).

Volume of conical piece of iron =

$\frac{1}{3}\pi R^2 h$

$= \left(\frac{1}{3}\pi \times 14 \times 14 \times 30\right)$ cu. cm.

Volume of raised water

$= \pi r^2 \times 6.4$ cu. cm.

$\therefore \pi r^2 \times 6.4$

$= \frac{1}{3}\pi \times 14 \times 14 \times 30$

$\Rightarrow r^2 = \frac{14 \times 14 \times 10}{6.4}$

$\Rightarrow r^2 = \dfrac{14^2 \times 10^2}{8^2}$

$\Rightarrow r = \dfrac{14 \times 10}{8}$

$\Rightarrow 2r = \dfrac{2 \times 14 \times 10}{8}$

= 35 cm = diameter

194. (1) The base of a prism is a triangular.

Semi-perimeter of triangle(s)

$= \dfrac{5+10+13}{2} = \dfrac{28}{2} = 14$ cm.

$\therefore$ Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{14(14-5)(14-10)(14-13)}$

$= \sqrt{14 \times 9 \times 4 \times 1}$

$= 6\sqrt{14}$ sq. cm.

$\therefore$ Volume of prism

= Area of base × height

$= 6\sqrt{14} \times 10 = 60\sqrt{14}$ cu.cm.

= 60 × 3.742 = 224.52 cu.cm.

$\therefore$ Weight of the prism

= (224.52 × 7) gram

= 1571.64 gram

195. (3) Volume of cone $= \dfrac{1}{3}\pi r^2 h$

$= \dfrac{1}{3} \times \pi \times 15 \times 15 \times 20$

$= 1500\pi$ cu.cm.

$\therefore$ Volume of a smaller cone

$= \dfrac{1}{3}\pi \times 1.5 \times 1.5 \times 5$

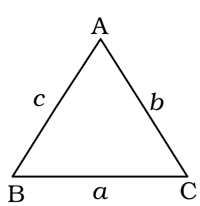
$= 3.75\pi$ cu.cm.

$\therefore$ Number of smaller cones

$= \dfrac{1500\pi}{3.75\pi} = 400$

196. (2) In Δ ABC,

$a = 13$ cm., $b = 20$ cm., $c = 21$ cm.,



Semi-perimeter = s = $\dfrac{a+b+c}{2}$

$= \left(\dfrac{13+20+21}{2}\right)$cm.

$= \dfrac{54}{2} = 27$ cm.

$\therefore$ Area of ΔABC = Area of the base of prism

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{27(27-13)(27-20)(27-21)}$

$= \sqrt{27 \times 14 \times 7 \times 6}$

$= \sqrt{3 \times 3 \times 3 \times 2 \times 7 \times 7 \times 2 \times 3}$

= 3 × 3 × 2 × 7 = 126 sq. cm.

$\therefore$ Volume of prism = Area of base × height

= 126 × 9 = 1134 cu. cm.

197. (3) Volume of earth and stones taken out from the tunnel

$= \pi r^2 h$

$= \left(\dfrac{22}{7} \times 2 \times 2 \times 56\right)$ cu. metre

= 704 cu. metre

Volume of ditch

= (48 × 16.5 × 4) cu. metre

= 3168 cu. metre

$\therefore$ Part of ditch filled

$= \dfrac{704}{3168} = \dfrac{2}{9}$ parts

198. (3) Volume of hemisphere

$= \dfrac{2}{3}\pi R^3$ cu. units

Volume of newphere

$= \dfrac{4}{3}\pi r^3$ cu. units

According to the question,

$\dfrac{2}{3}\pi R^3 = 4 \times \dfrac{4}{3}\pi r^3$

$\Rightarrow R^3 = 8r^3$

$\Rightarrow R = 2r$ units

$\therefore r = \dfrac{1}{2}$ R Units

199. (2) Volume of cylinder $= \pi r^2 h$

= (π × 8 × 8 × 2) cu. cm.

= 128 π cu. cm.

If the radius of the base of cone be R cm. then

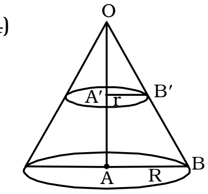
$\dfrac{1}{3}\pi R^2 H = 128\pi$

$\Rightarrow R^2 \times 6 = 128 \times 3$

$\Rightarrow R^2 = \dfrac{128 \times 3}{6} = 64$

$\Rightarrow R = \sqrt{64} = 8$ cm.

200. (4)



OA′ = h units

AA′ = H units

AB = R units

A′B′ = r units.

A′B′ ∥ AB

∠ OA′ B′ = ∠ OAB

∠ OB′A′ = ∠ OBA

$\therefore$ Δ OAB ~ Δ OA′B′

$\therefore \dfrac{OA'}{OA} = \dfrac{A'B'}{AB}$

$\Rightarrow \dfrac{h}{H+h} = \dfrac{r}{R}$

According to the question,

$\dfrac{1}{3}\pi r^2 h = \dfrac{1}{3}\pi R^2 (H+h) - \dfrac{1}{3}\pi r^2 h$

$\Rightarrow \dfrac{2}{3}\pi r^2 h = \dfrac{1}{3}\pi R^2 (H+h)$

$\Rightarrow 2\dfrac{r^2}{R^2} = \dfrac{H+h}{h}$

$\Rightarrow 2.\dfrac{h^2}{(H+h)^2} = \dfrac{H+h}{h}$

$\Rightarrow \dfrac{(H+h)^3}{h^3} = 2$

$\Rightarrow \dfrac{H+h}{h} = \sqrt[3]{2}$

$\Rightarrow \dfrac{H}{h} + 1 = \sqrt[3]{2}$

$\Rightarrow \dfrac{H}{h} = \dfrac{\sqrt[3]{2}-1}{1}$

$\therefore \dfrac{h}{H} = 1 : \sqrt[3]{2} - 1$

201. (4) Volume of sphere $= \dfrac{4}{3}\pi r^3$

$\therefore$ Total volume of both spheres

$= \dfrac{4}{3}\pi (r_1^3 + r_2^3)$

$= \dfrac{4}{3}\pi (1^3 + 6^3)$

$= \dfrac{4}{3}\pi (1 + 216)$

$= \left(\frac{4\pi}{3} \times 217\right)$ cu. cm.

If the internal radius of hollow sphere = r cm, then

$\therefore$ Volume of the iron of this sphere = $\frac{4}{3}\pi(9^3 - r^3)$ cu.cm.

According to the question,

$\frac{4}{3}\pi(9^3 - r^3) = \frac{4\pi}{3} \times 217$

$\Rightarrow 729 - r^3 = 217$

$\Rightarrow r^3 = 729 - 217 = 512$

$\Rightarrow r^3 = (8)^3$

$\Rightarrow r = 8$ cm

$\therefore$ Required thickness

$= 9 - r = 9 - 8 = 1$ cm.

202. (1) Area of the base of prism

$= \frac{1}{2}(10+6) \times 5$

$= \frac{1}{2} \times 16 \times 5 = 40$ sq. cm.

$\therefore$ Volume of prism

= Area of base × height

= 40 × 8 = 320 cu. cm.

203. (4) Capacity of bowl = $\frac{2}{3}\pi r^3$

$= \left(\frac{2}{3} \times \frac{22}{7} \times 6 \times 6 \times 6\right)$ cu. cm.

$= \frac{3168}{7} = 452.57$ cu. cm.

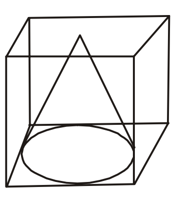
204. (4) Volume of regular tetrahedron

$= \frac{a^3}{6\sqrt{2}}$ cu. cm.

$= \frac{1}{6\sqrt{2}} = \frac{\sqrt{2}}{6\sqrt{2} \times \sqrt{2}}$ cu. cm.

$= \frac{\sqrt{2}}{12}$ cu. cm.

205. (3)



The volume of cone should be maximum.

$\therefore$ Radius of the base of cone

$= \frac{\text{Edge of cube}}{2}$

$= \frac{4.2}{2} = 2.1$ dm.

Height = Edge of cube = 4.2 dm.

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \left(\frac{1}{3} \times \frac{22}{7} \times 2.1 \times 2.1 \times 4.2\right)$ cu.dm.

= 19.404 cu. dm.

206. (2) Length of base = $3x$ cm and breadth = $2x$ cm (let)

Total surface area of prism

= perimeter of base × height + 2 × area of base

$= [2(3x + 2x) \times 12 + 2 \times 3x \times 2x]$ sq. cm.

$= (120x + 12x^2)$ sq. cm.

According to the question,

$120x + 12x^2 = 288$

$\Rightarrow x^2 + 10x = 24$

$\Rightarrow x^2 + 10x - 24 = 0$

$\Rightarrow x^2 + 12x - 2x - 24 = 0$

$\Rightarrow x(x + 12) - 2(x + 12) = 0$

$\Rightarrow (x - 2)(x + 12) = 0$

$\Rightarrow x = 2$ because $x \neq -12$

$\therefore$ Volume of prism

= Area of base × height

$= (3x \times 2x \times 12)$ cu. cm.

$= 72x^2 = (72 \times 2 \times 2)$ cu. cm.

= 288 cu. cm.

207. (4) Radius of cone so formed = 9 cm

Its height = 12 cm

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 9 \times 9 \times 12$

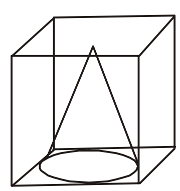
$= 324\pi$ cu. cm.

208. (4) Volume of right circular cylinder = $\pi r^2 h$

$= \frac{22}{7} \times 5 \times 5 \times 21$

= 1650 cu. cm.

209. (2)



Radius of the base of cone

$= \frac{7}{2}$ cm

Its height = 7 cm

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \left(\frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 7\right)$ cu.cm.

$= \frac{539}{6} = 89.83$ cu.cm.

210. (1) Volume of two solid metallic spheres $= \frac{4}{3}\pi(r_1^3 + r_2^3)$

$= \frac{4\pi}{3}(1^3 + 6^3)$

$= \frac{4\pi}{3}(1 + 216)$

$= \left(\frac{4\pi}{3} \times 217\right)$ cu cm.

Internal radius of hollow sphere = r cm (let)

$\therefore \frac{4}{3}\pi\left((r+1)^3 - r^3\right)$

$= \frac{4\pi}{3} \times 217$

$\Rightarrow r^3 + 3r^2 + 3r + 1 - r^3 = 217$

$\Rightarrow 3r^2 + 3r + 1 = 217$

$\Rightarrow 3r^2 + 3r - 216 = 0$

$\Rightarrow r^2 + r - 72 = 0$

$\Rightarrow r^2 + 9r - 8r - 72 = 0$

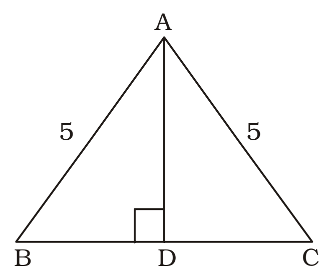
$\Rightarrow r(r + 9) - 8(r + 9) = 0$

$\Rightarrow (r - 8)(r + 9) = 0$

$\Rightarrow r = 8$ cm. because $r \neq -9$

$\therefore$ External radius of hollow sphere = 9 cm.

211. (1)



AB = AC = 5 cm.

BD = DC = 3 cm.

From Δ ABD,

$AD = \sqrt{AB^2 - BD^2}$

$= \sqrt{5^2 - 3^2} = \sqrt{25 - 9}$

$= \sqrt{16} = 4$ cm.

$\therefore$ Area of the base of prism

$= \frac{1}{2} \times BC \times AD$

$= \frac{1}{2} \times 6 \times 4 = 12$ sq. cm.

$\therefore$ Volume of prism

= Area of base × height

= 12 × 8 = 96 cu. cm.

212. (2) Increase in water level
= x cm (let)
According to the question,
$2.1 \times 1.5 \times 10000 \times x$
$= 630 \times 1000$ cu. cm.
$\Rightarrow 21 \times 15 \times 100 \times x = 630000$
$\Rightarrow x = \frac{630000}{21 \times 15 \times 100} = 20$ cm.
= 0.2 metre

213. (1) Volume of larger sphere
$= \frac{4}{3}\pi R^3 = \frac{4}{3}\pi (9)^3$ cu.cm.
$= 972\pi$ cu.cm.
Volume of smaller sphere
$= \frac{4}{3}\pi (6)^3 = 288\pi$ cu.cm.
Volume of cylinder
$= \pi r^2 h$
$= \pi \times 36 h$
$= 36\pi h$ cu.cm.
$\therefore 288\pi + 36\pi h = 972\pi$
$\Rightarrow 288 + 36h = 972$
$\Rightarrow 36h = 972 - 288 = 684$
$\Rightarrow h = \frac{684}{36} = 19$ cm.

214. (2) Volume of used iron
$= \pi (R^2 - r^2)h$
where R = 4 cm; r = 3 cm.
$= \frac{22}{7}(4^2 - 3^2) \times 20$
$= \frac{22}{7} \times (4 + 3)(4 - 3) \times 20$
$= \frac{22}{7} \times 7 \times 20 = 440$ cu. cm.

215. (3) Let the length of rectangular box be l cm.
Width = b cm.
Height = h cm.
According to the question,
$lb = 12$ sq. cm.
$bh = 15$ sq. cm.
$hl = 20$ sq. cm.
On multiplying,
$l^2 \times b^2 \times h^2 = 12 \times 15 \times 20$
$\therefore$ Volume of box
$= \sqrt{12 \times 15 \times 20}$
$= \sqrt{3600} = 60$ cu. cm.

216. (1) Volume of removed material =
$\pi r^2 h - \frac{1}{3}\pi r^2 h = \frac{2}{3}\pi r^2 h$
$= \left(\frac{2}{3} \times \frac{22}{7} \times 0.6 \times 0.6 \times 1.4\right)$ cu. cm.
= 1.056 cu. cm.

217. (4) Volume of bowl $= \frac{2}{3}\pi r^3$
$= \frac{2}{3}\pi \times 9 \times 9 \times 9$
$= 486\pi$ cu. cm. = volume of liquid
Volume of 1 bottle $= \pi R^2 H$
$= \pi \times \frac{3}{2} \times \frac{3}{2} \times 4$
$= 9\pi$ cu. cm.
$\therefore$ Number of bottles $= \frac{486\pi}{9\pi}$
= 54

218. (4) Volume of water filled by pipe in 30 minutes
$= \left(\frac{40 \times 1000000}{2}\right)$ cu.cm
= 20000000 cu. cm.
$\therefore$ Height of water level
$= \frac{20000000}{8000 \times 4000} = \frac{5}{8}$ cm.

219. (3) Let the radius of cylinder be r cm.
Height = h cm.
According to the question,
$2\pi rh + 2\pi r^2 = 231$
Again, $2\pi rh = \frac{2}{3} \times 231 = 154$
$\therefore 2\pi r^2 = 231 - 154$
$\Rightarrow 2 \times \frac{22}{7} r^2 = 77$
$\Rightarrow r^2 = \frac{77 \times 7}{22 \times 2} = \frac{49}{2 \times 2}$
$\therefore r = \frac{7}{2}$ cm.
$\therefore 2\pi rh = 154$
$\Rightarrow 2 \times \frac{22}{7} \times \frac{7}{2} \times h = 154$
$\Rightarrow 22h = 154$
$\Rightarrow h = \frac{154}{22} = 7$ cm.
$\therefore$ Volume of cylinder $= \pi r^2 h$
$= \left(\frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 7\right)$ cu. cm.
= 269.5 cu. cm.

220. (1) Total volume of ice-cream $= \pi r^2 h$
$= \pi\left(\frac{21}{2}\right)^2 \times 38$ cu. cm.
$= \frac{8379\pi}{2}$ cu. cm.
For a cone of ice-cream,
Volume of cone
$= \frac{1}{3}\pi \times \left(\frac{7}{2}\right)^2 \times 12$ cu. cm.
$\therefore$ Volume of hemi–sphere
$= \frac{2}{3}\pi\left(\frac{7}{2}\right)^3$ cu. cm.
Total volume of cone–shaped ice cream
$= \frac{\pi}{3}\left(\frac{49}{4} \times 12 + \frac{343}{4}\right)$ cu. cm.
$= \frac{\pi}{3}\left(147 + \frac{343}{4}\right)$ cu. cm.
$= \frac{\pi}{3}\left(\frac{588 + 343}{4}\right)$ cu. cm.
$= \frac{\pi}{3} \times \frac{931}{4}$ cu. cm.
$\therefore$ Number of cones
$= \frac{8379\pi}{2} \times \frac{3 \times 4}{\pi \times 931} = 54$

221. (4) According to the question,
$2\pi r = 7$
$\Rightarrow 2 \times \frac{22}{7} \times r = 7$
$\Rightarrow r = \frac{7 \times 7}{2 \times 22}$ cm.
$\therefore$ Volume of Cylinder $= \pi r^2 h$
$= \frac{22}{7} \times \frac{7 \times 7 \times 7 \times 7}{2 \times 22 \times 2 \times 22} \times 11$
$= \frac{7 \times 7 \times 7}{8}$
= 42.875 cu. cm.

222. (2) Volume of spherical aquarium
$= (11 \times 1.54)$ cu. metre
= 16.94 cu. metre

223. (3) Volume of pyramid
$= \frac{1}{3} \times$ area of base $\times$ height
$\Rightarrow 220 = \frac{1}{3} \times 55 \times$ height
$\Rightarrow$ Height $= \frac{220 \times 3}{55}$
= 12 metre

224. (4) Volume of wire $= \pi r^2 h$
when $r_1 = \frac{r}{3}$, $h_1 = ?$
$\therefore \pi r^2 h = \pi r_1^2 h_1$
$\Rightarrow r^2 h = \left(\frac{r}{3}\right)^2 \times h_1$
$\Rightarrow h_1 = 9h$

225. (2) Volume of prism = Area of base × height

$\Rightarrow$ $100 = \frac{1}{2} \times x \times 2x \times 25$

$\Rightarrow$ $x^2 = \frac{100}{25} = 4$

$\Rightarrow$ $x = 2$

$\therefore$ Smaller sides of triangle = 2 cm and 4 cm

$\therefore$ Largest side = $\sqrt{2^2 + 4^2}$

$= \sqrt{4+16}$

$= \sqrt{20} = 2\sqrt{5}$ cm.

[$\because$ The triangle is right angled.]

226. (3) Let the edge of cube be a units.

Its volume = a^3 cubic units

Radius of sphere = $\frac{a}{2}$ units

Volume of sphere = $\frac{4}{3}\pi\left(\frac{a}{2}\right)^3$

$= \frac{\pi a^3}{6}$ cubic units

$\therefore$ Required ratio = $a^3 : \frac{\pi a^3}{6}$ = 6 : π

227. (3) Water stored in tank

$= \frac{12 \times 10 \times 50}{100}$ = 60 cu. metre.

= Capacity of tank.

228. (4) Volume of cylinder = $\pi r^2 h$

= ($\pi \times 6 \times 6 \times 56$) cu. cm.

Volume of hemi-spherical ball = $\left(\frac{2}{3}\pi \times 0.75 \times 0.75 \times 0.75\right)$ cu. cm.

$\therefore$ Total number of balls

$= \frac{\pi \times 6 \times 6 \times 56}{\frac{2}{3} \times \pi \times 0.75 \times 0.75 \times 0.75}$

= 7168

229. (4) Volume of 1 coin = $\pi r^2 h$

= ($\pi \times 0.75 \times 0.75 \times 0.2$) cu. cm.

Volume of cylinder

= ($\pi \times 3 \times 3 \times 8$) cu. cm.

$\therefore$ Number of coins

$= \frac{\pi \times 3 \times 3 \times 8}{\pi \times 0.75 \times 0.75 \times 0.2}$

$= \frac{3 \times 3 \times 8 \times 100 \times 100 \times 10}{75 \times 75 \times 2}$

= 640

230. (3) Volume of sphere

$= \frac{4}{3}\pi r^3$

Volume of cone = $\frac{1}{3}\pi r^2 h$

According to the question,

$\frac{1}{3}\pi r^2 h = \frac{4}{3}\pi r^3$

$\Rightarrow$ $h = 4r = 4 \times 5 = 20$ cm.

231. (4) $\frac{d_1}{d_2} = \frac{r_1}{r_2} = \frac{3}{2}$

$V_1 = V_2$

$\Rightarrow$ $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\Rightarrow$ $\frac{h_1}{h_2} = \left(\frac{r_2}{r_1}\right)^2 = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$

= 4 : 9

232. (3) Volume of sand = Volume of cylindrical vessel

$= \pi r^2 h$

$= \pi \times (18)^2 \times 32$ cu.cm.

Volume of conical heap

$= \pi \times 18 \times 18 \times 32$

$\Rightarrow$ $\frac{1}{3}\pi R^2 H = \pi \times 18 \times 18 \times 32$

$\Rightarrow$ $\frac{1}{3} \times R^2 \times 24 = 18 \times 18 \times 32$

$\Rightarrow$ $R^2 = \frac{18 \times 18 \times 32 \times 3}{24} = 1296$

$\Rightarrow$ $R = \sqrt{1296} = 36$ cm.

233. (2) If the rise in water level be h cm., then

$\pi r^2 h = \frac{4}{3}\pi R^3$

where r = radius of cylindrical vessel,

R = radius of solid sphere

$\Rightarrow$ $4^2 \times h = \frac{4}{3} \times (3)^3$

$\Rightarrow$ $h = \frac{4 \times 3 \times 3}{4 \times 4} = \frac{9}{4}$

= 2.25 cm.

234. (4) Volume of the silver used in hollow hemispherical bowl

$= \frac{2}{3}\pi (R^3 - r^3)$

Where R = external radius

r = internal radius

$= \frac{2}{3}\pi (8^3 - 4^3)$ cu. cm.

$= \frac{2}{3}\pi (512 - 64)$ cu. cm.

$= \frac{2\pi}{3} \times 448$ cu. cm.

$\therefore$ Volume of cone = $\frac{1}{3}\pi r_1^2 h$

$= \frac{1}{3}\pi\, 8^2 \times h$

$\therefore$ $\frac{1}{3}\pi \times 8^2 \times h = \frac{2\pi}{3} \times 448$

$\Rightarrow$ $h = \frac{2 \times 448}{8 \times 8} = 14$ cm.

235. (3) According to the question,

$r + h = 20$ cm.

Total surface area of cylinder = $2\pi rh + 2\pi r^2$

$= 2\pi r(h + r)$

$\therefore$ $2\pi r \times 20 = 880$

$\Rightarrow$ $\pi r = \frac{880}{40} = 22$

$\Rightarrow$ $\frac{22}{7} \times r = 22$

$\Rightarrow$ $r = \frac{22 \times 7}{22} = 7$ cm.

$\therefore$ $r + h = 20$

$\Rightarrow$ $h = 20 - 7 = 13$ cm.

$\therefore$ Volume of cylinder = $\pi r^2 h$

$= \frac{22}{7} \times 7 \times 7 \times 13$

= 2002 cu. cm.

236. (1) Radius of solid sphere

= R units

Radius of solid hemisphere

= r units

According to the question,

$4\pi R^2 = 3\pi r^2$

$\Rightarrow$ $4R^2 = 3r^2$

$\Rightarrow$ $\frac{R^2}{r^2} = \frac{3}{4} \Rightarrow \frac{R}{r} = \frac{\sqrt{3}}{2}$

$\therefore$ Ratio of volumes = $\frac{\frac{4}{3}\pi R^3}{\frac{2}{3}\pi r^3}$ =

$2\left(\frac{R}{r}\right)^3 = 2\left(\frac{\sqrt{3}}{2}\right)^3 = \frac{3\sqrt{3}}{4} = 3\sqrt{3} : 4$

237. (3) Area of the base of prism

$= \frac{1}{2}$ (sum of parallel sides) × perpendicular distance

$= \frac{1}{2}(25 + 11) \times 16$

$= \frac{1}{2} \times 36 \times 16 = 288$ sq. cm.

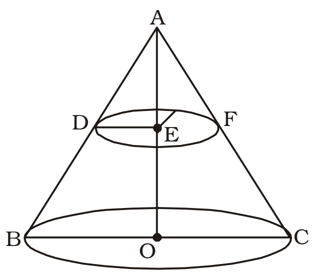
$\therefore$ Volume of prism = Area of base × height

= 288 × 10

= 2880 cu. cm.

238. (1) Volume of the metal of hollow cylinder = $\pi(R^2 - r^2)\,h$
$= \pi(6.75^2 - 5.25^2) \times 15$
$= \pi(6.75 + 5.25)(6.75 - 5.25) \times 15$
$= \pi \times 12 \times 1.5 \times 15$ cu. cm.
If the radius of the base of solid cylinder be r_1 cm, then
$\pi r_1^2 h_1 = \pi \times 12 \times 1.5 \times 15$
$\Rightarrow r_1^2 \times \frac{15}{2} = 12 \times 1.5 \times 15$
$\Rightarrow r_1^2 = 12 \times 1.5 \times 2$
$\Rightarrow r_1^2 = 36 \Rightarrow r_1 = \sqrt{36} = 6$ cm.

239. (3)



Volume of larger cone $= \frac{1}{3}\pi r^2 h$
$\Delta ADE \sim \Delta ABO$
$\therefore \frac{DE}{BO} = \frac{AE}{AO}$
$\Rightarrow \frac{DE}{r} = \frac{\frac{h}{2}}{h} \Rightarrow DE = \frac{r}{2}$
Volume of cone ADF
$= \frac{1}{3}\pi\left(\frac{r}{2}\right)^2 \times \frac{h}{2}$
$= \frac{1}{24}\pi r^2 h$ cu. units
Volume of remaining part
$= \frac{1}{3}\pi r^2 h - \frac{1}{24}\pi r^2 h$
$= \pi r^2 h\left(\frac{1}{3} - \frac{1}{24}\right)$
$= \pi r^2 h\left(\frac{8-1}{24}\right)$
$= \frac{7}{24}\pi r^2 h$ cu. units
$\therefore$ Required ratio
$= \frac{1}{24}\pi r^2 h : \frac{7}{24}\pi r^2 h$
$= 1 : 7$

240. (3) Volume of both spheres = Volume of water raised in the cylinder
$= \pi \times 9^2 \times 4$
$= 324\pi$ cu. cm.
Radius of first sphere = r cm.
Radius of second sphere
$= \frac{r}{2}$ cm.
$\therefore \frac{4}{3}\pi\left(r^3 + \frac{r^3}{8}\right) = 324\pi$
$\Rightarrow \left(\frac{8r^3 + r^3}{8}\right) = \frac{324 \times 3}{4}$
$\Rightarrow \frac{9r^3}{8} = 243$
$\Rightarrow r^3 = \frac{243 \times 8}{9} = 216$
$\therefore r = \sqrt[3]{216} = 6$ cm.
$\therefore$ Radius of second sphere $= 3$ cm.

241. (4) $\frac{r_1}{r_2} = \frac{3}{2}$; $\frac{h_1}{h_2} = \frac{3}{7}$
$\therefore \frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$
$= \left(\frac{3}{2}\right)^2 \times \frac{3}{7}$
$= \frac{9}{4} \times \frac{3}{7} = \frac{27}{28} = 27 : 28$

242. (4) $\frac{d_1}{d_2} = \frac{r_1}{r_2} = \frac{4}{5}$
$\therefore \frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$
$\Rightarrow \frac{V_1}{V_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$
$\Rightarrow \frac{1}{4} = \left(\frac{4}{5}\right)^2 \times \frac{h_1}{h_2}$
$\Rightarrow \frac{h_1}{h_2} = \frac{1}{4} \times \frac{5 \times 5}{4 \times 4} = \frac{25}{64} = 25:64$

243. (3) Let the internal radius of pipe be r cm.
External radius = R cm = 9 cm.
$\therefore$ Volume of the material of pipe
$= \pi(R^2 - r^2)h$
$\Rightarrow \frac{22}{7}(9^2 - r^2) \times 14 = 748$
$\Rightarrow (81 - r^2) = \frac{748 \times 7}{22 \times 14} = 17$
$\Rightarrow r^2 = 81 - 17 = 64$
$\Rightarrow r = \sqrt{64} = 8$ cm
$\therefore$ Thickness of pipe
$= 9 - 8 = 1$ cm.

244. (3) Diagonal of cube
$= \sqrt{3} \times \text{edge}$
$\sqrt{3} \times \text{edge} = \sqrt{192}$
$\Rightarrow \sqrt{3}x = \sqrt{64 \times 3} = 8\sqrt{3}$
Where x = edge of cube
$\Rightarrow x = 8$ cm
$\therefore$ Volume of cube
$= (8)^3 = 512$ cu.cm.

245. (1) Slant height of cone = l cm. $= 10$ cm.
Radius of base = r = 6 cm.
$\therefore h = \sqrt{l^2 - r^2}$
$= \sqrt{10^2 - 6^2} = \sqrt{(10+6)(10-6)}$
$= \sqrt{16 \times 4} = 4 \times 2 = 8$ cm.
$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$
$= \left(\frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 8\right)$ cu. cm.
$= \frac{6336}{21} = 301.71$ cu. cm.

246. (3) In both cases, volume remains same.
If the radius of new sphere be R units, then
$\frac{4}{3}\pi R^3 = \frac{4}{3}\pi r_1^3 + \frac{4}{3}\pi r_2^3 + \frac{4}{3}\pi r_3^3$
$\Rightarrow R^3 = r_1^3 + r_2^3 + r_3^3$
$\therefore R = \left(r_1^3 + r_2^3 + r_3^3\right)^{\frac{1}{3}}$ units

247. (2) Mass = Volume × density
$\therefore \frac{\text{Mass of sphere A}}{\text{Mass of sphere B}}$
$= \frac{\frac{4}{3}\pi R^3 \times d_1}{\frac{4}{3}\pi r^3 \times d_2}$
$\Rightarrow \frac{8}{27} = \frac{R^3 \times 8}{r^3}$
$\Rightarrow \frac{R^3}{r^3} = \frac{1}{27}$
$\Rightarrow \frac{R}{r} = \sqrt[3]{\frac{1}{27}} = \frac{1}{3} = 1 : 3$

248. (4) Volume of larger ball

$= \frac{4}{3}\pi \times (6)^3$ cu. cm.

Volume of a smaller ball

$= \frac{4}{3}\pi\left(\frac{3}{10}\right)^3$ cu. cm.

$\therefore$ Number of smaller balls

$= \dfrac{\frac{4}{3}\pi \times 6 \times 6 \times 6}{\frac{4}{3}\pi \times \frac{3}{10} \times \frac{3}{10} \times \frac{3}{10}}$

$= \dfrac{6 \times 6 \times 6 \times 1000}{3 \times 3 \times 3}$

= 8000

249. (1) Radius of the base of cone = $2r$ units

Radius of the base of cylinder = r units

Height of cone = height of cylinder = h units

$\therefore$ Required ratio

$= \dfrac{\frac{1}{3}\pi(2r)^2 \times h}{\pi r^2 h}$

$= \frac{4}{3}\,\frac{\pi r^2 h}{\pi r^2 h} = \frac{4}{3}$: 4 : 3

250. (1) Area of the base of pyramid = 57 sq. units

Height = 10 units

$\therefore$ Volume of pyramid

$= \frac{1}{3}$ × Area of base × height

$= \left(\frac{1}{3} \times 57 \times 10\right)$ cu. units

= 190 cu. units

251. (4) Volume of sphere = Volume of cylinder

$\Rightarrow \frac{4}{3}\pi r^3 = \pi r^2 h$

$\Rightarrow 4r = 3h$

$\Rightarrow \frac{h}{r} = \frac{4}{3} = 4 : 3$

252. (2) Volume of cylindrical rod = 44 × volume of solid cube

$\Rightarrow \pi r^2 h = 44 \times (\text{edge})^3$

$\Rightarrow \frac{22}{7} \times 32 \times 32 \times h$

$= 44 \times 8 \times 8 \times 8$

$\Rightarrow h = \dfrac{44 \times 8 \times 8 \times 8 \times 7}{22 \times 32 \times 32}$

= 7 cm.

253. (1) Volume of sand in cylindrical vessel

$= \pi r^2 h$

$= \pi \times (4)^2 \times 5$ cu. cm.

$= 80\pi$ cu. cm.

According to the question volume of conical shape

$= 80\pi$ cu. cm.

$\Rightarrow \frac{1}{3}\pi R^2 H = 80\pi$

$\Rightarrow \frac{1}{3} \times 6 \times 6 \times H = 80$

$\Rightarrow 12\,H = 80$

$\Rightarrow H = \frac{80}{12} = 6.67$ cm.

254. (2) $\dfrac{V_1}{V_2} = \dfrac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \left(\dfrac{r_1}{r_2}\right)^2 \left(\dfrac{h_1}{h_2}\right)$

$= \left(\frac{2}{3}\right)^2\left(\frac{5}{3}\right) = \frac{20}{27} = 20 : 27$

255. (1) Volume of larger cube

$= x_1^3 + x_2^3 + x_3^3$

$= (6^3 + 8^3 + 10^3)$ cu. cm.

$= (216 + 512 + 1000)$ cu. cm.

$= 1728$ cu. cm.

$\therefore$ Its edge $= \sqrt[3]{1728}$

$= \sqrt[3]{12 \times 12 \times 12} = 12$ cm.

256. (4) In both cases, volume will remain same.

Volume of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi(6)^3$

$= 288\pi$ cu. cm.

If the length of wire be h cm., then

$\Rightarrow \pi R^2 h = 288\pi$

$\Rightarrow (0.2)^2 \times h = 288$

$\Rightarrow h = \dfrac{288}{0.04} = 7200$ cm.

= 72 metre

257. (4) Volume of wire $(V_1) = \pi r^2 h$

Case II,

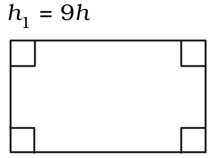
Volume of wire $(V_2) = \pi\left(\frac{r}{3}\right)^2 h_1$

$\because V_1 = V_2$

$\therefore \pi r^2 h = \dfrac{\pi r^2 h_1}{9}$

$\Rightarrow h_1 = 9h$

258. (2)



Length of box = 25 – 2 × 2

= 21 cm.

Width of box = 20 – 2 × 2

= 16 cm.

Height of box = 2 cm.

$\therefore$ Volume of box

= (21 × 16 × 2) cu. cm.

= 672 cu. cm.

259. (1) Volume of solid sphere

$= \frac{4}{3}\pi(3)^3$

$= 36\pi$ cu. cm.

Volume of the metal of tube

$= \pi(R^2 - r^2)h$ cu. cm.

where R = 5 cm.

r = in-radius

$\therefore \pi(R^2 - r^2)\,h = 36\pi$

$\Rightarrow (25 - r^2) \times 4 = 36$

$\Rightarrow 25 - r^2 = \frac{36}{4} = 9$

$\Rightarrow r^2 = 25 - 9 = 16$

$\Rightarrow r = \sqrt{16} = 4$ cm.

$\therefore$ Thickness of tube = 5 – 4

= 1 cm.

260. (4) Volume of new single sphere

$= \frac{4}{3}\pi\left(r_1^3 + r_2^3 + r_3^3\right)$

$= \frac{4}{3}\pi\left(3^3 + 4^3 + 5^3\right)$ cu. cm.

$= \frac{4}{3}\pi(27 + 64 + 125)$ cu.cm.

$= \frac{4}{3}\pi \times 216$ cu.cm.

$\therefore \frac{4}{3}\pi R^3 = \frac{4}{3}\pi \times 216$

where R = radius of new sphere

$\Rightarrow R^3 = 216$

$\Rightarrow R = \sqrt[3]{216} = \sqrt[3]{6 \times 6 \times 6} = 6$ cm

$\therefore$ Diameter of new sphere

= 2 × 6 = 12

261. (4) Let the radius of base = r cm

$\therefore h_1 = 3r$ cm.

$h_2 = 4r$ cm.

According to the question,

$\pi r^2 h_2 - \pi r^2 h_1 = 1078$

$\Rightarrow \pi r^2(h_2 - h_1) = 1078$

$\Rightarrow \frac{22}{7}r^2(4r - 3r) = 1078$

$\Rightarrow \frac{22}{7}r^3 = 1078$

$\Rightarrow r^3 = \dfrac{1078 \times 7}{22} = 49 \times 7$

$\therefore r = \sqrt[3]{49 \times 7} = 7$ cm.

TYPE-V

1. (4) Required total area
= Area of four walls + Area of the base
$= 2 \times 1.25\ (6 + 4) + 6 \times 4$
$= 2.5 \times 10 + 24 = 49\ m^2$.

2. (2) Per cent change in surface area

$$= \left[x + y + \frac{xy}{100}\right]$$

$$= \left[15 + (-10) + \frac{15 \times (-10)}{100}\right]$$

$$= \left[15 - 10 - \frac{150}{100}\right] = [15 - 11.5]$$

= 3.5 per cent.
(+ve) sign shows 3.5 per cent increases.

3. (1) Let for the first cylinder,
$r_1 = 3x$
$h_1 = 2y$
For the second cylinder,
$r_2 = 5x$
$h_2 = 3y$

$$\therefore \frac{2\pi r_1\ h_1}{2\pi r_2\ h_2} = \frac{2\pi \times 3x \times 2y}{2\pi \times 5x \times 3y} = \frac{2}{5}$$

$\Rightarrow\ 2 : 5$

4. (2) Volume of the tank = $(3 \times 5 \times 1.54)$ cu.metre
Volume of water flowing through pipe per second

$$= \pi \times \left(\frac{7}{100}\right)^2 \times 5\ m^3$$

$\therefore$ Required time

$$= \frac{3 \times 5 \times 1.54 \times 100 \times 100 \times 7}{22 \times 7 \times 7 \times 5}$$

= 300 seconds = 5 minutes

5. (1) Area of the curved surface

$$= \frac{1}{3} \times 462 = 154 \text{ sq.cm}$$

$\therefore\ 2\pi rh + 2\pi r^2 = 462$
$\Rightarrow\ 154 + 2\pi r^2 = 462$
$\Rightarrow\ 2\pi r^2 = 462 - 154 = 308$

$$\Rightarrow r^2 = \frac{308}{2\pi} = \frac{308 \times 7}{2 \times 22} = 49$$

$$\Rightarrow r = \sqrt{49} = 7 \text{ cm}$$

6. (1) Lateral surface area of the cylinder = $2\pi rh$

$$= 2 \times \frac{22}{7} \times \frac{7}{2} \times 16$$

= 352 sq.cm.

7. (1) Let the radius of the base be r metre.
then $3\ \times 2\pi r^2 = 2\ \times 2\pi rh$
$\Rightarrow 3r = 2h$
$\Rightarrow 3r = 2 \times 6 \Rightarrow r = 4$ metre

8. (1) Curved surface of cylinder $= 2\pi rh$
Now,

Radius = $\frac{1}{3}r$; height = 6h

Curved surface

$$= 2\pi \times \frac{1}{3} r \times 6h = (2\pi rh) \times 2$$

$\therefore$ Increase will be twice.

9. (3) $V = \pi r^2 h$
$\Rightarrow 550 = \pi \times 5x \times 5x \times 7x$

$$\Rightarrow 550 = \frac{22}{7} \times 25 \times 7x^3$$

$$\Rightarrow x^3 = \frac{550}{22 \times 25} = 1 \Rightarrow x = 1$$

$\therefore$ Area of curved surface

$$= 2 \times \frac{22}{7} \times 5 \times 7$$

= 220 sq.cm.

10. (3) Curved surface of cylinder $= 2\pi rh = a$
Area of base $= \pi r^2 = b$
$\therefore\ 2\pi rh = a$
$\Rightarrow 4\pi^2 r^2 h^2 = a^2 \Rightarrow 4\pi b h^2 = a^2$

$$\Rightarrow h^2 = \frac{a^2}{4\pi b}$$

$$\Rightarrow h = \frac{a}{2\sqrt{\pi b}} \text{ cm.}$$

11. (3) Length of the largest rod

$$= \sqrt{l^2 + b^2 + h^2}$$

$$= \sqrt{16^2 + 12^2 + \left(\frac{32}{3}\right)^2}$$

$$= \sqrt{400 + \frac{1024}{9}} = \sqrt{\frac{4624}{9}} = \frac{68}{3}$$

$$= 22\frac{2}{3} m$$

12. (3) Let the side of the two cubes are x and y.
According to the question

$$\frac{x^3}{y^3} = \frac{27}{64} = \frac{(3)^3}{(4)^3},\ \therefore \frac{x}{y} = \frac{3}{4}$$

We know that surface area of the cube = $6 \times (\text{side})^2$
$\therefore$ Ratio of their surface areas

$$= \frac{6x^2}{6y^2} = \frac{6 \times 3^2}{6 \times 4^2} = \frac{9}{16} = 9 : 16$$

13. (1) The length of the longest rod
= The diagonal of the hall

$$= \sqrt{l^2 + b^2 + h^2}$$

$$= \sqrt{10^2 + 6^2 + 4^2}$$

$$= \sqrt{100 + 36 + 16} = \sqrt{152}$$

$$= \sqrt{2 \times 2 \times 38} = 2\sqrt{38} \text{ m}$$

14. (2) We have
2 × volume of cube = Volume of cuboid
$\Rightarrow 2 \times (\text{edge})^3 = 9 \times 8 \times 6$ cu.cm.
$\Rightarrow (\text{edge})^3 = 9 \times 8 \times 3$

$$\Rightarrow \text{Edge} = \sqrt[3]{3 \times 3 \times 3 \times 2 \times 2 \times 2}$$

= 3 × 2 = 6 cm.
$\therefore$ Total surface area of the cube
$= 6 \times (\text{edge})^2$
$= 6 \times 6 \times 6 = 216\ cm^2$.

15. (4) Length of largest bamboo (Diagonal) $= \sqrt{(5)^2 + (4)^2 + (3)^2}$

$$= \sqrt{25 + 16 + 9} = \sqrt{50}$$

$$= \sqrt{25 \times 2} = 5\sqrt{2} \text{ m}$$

16. (3) The required length = Diagonal of the room

$$= \sqrt{12^2 + 9^2 + 8^2}$$

$$= \sqrt{144 + 81 + 64}$$

$$= \sqrt{289} = 17\text{m}$$

17. (4) Surface area of a small cube
$= 6 \times (\text{edge})^2 = 6 \times 1 = 6\ cm^2$
Surface area of the large cube = $6\ (5)^2 = 6 \times 25\ cm^2$.
$\therefore$ Required ratio

$$= \frac{6}{6 \times 25} = \frac{1}{25}$$

or 1 : 25

18. (3) Area of four walls of a room
= 2 (length + breadth) × height
= Perimeter of floor × height
$= 18 \times 3 = 54\ m^2$

19. (2) Length of the longest rod

Diagonal = $\sqrt{10^2 + 10^2 + 5^2}$

$= \sqrt{225} = 15$ metre

20. (2) Area of the four walls of the room
= 2 × height (length × breadth)
= 2 × 3 (4 + 3) = 42 sq. metre
Area of ceiling = 4 × 3
= 12 sq. metre
$\therefore$ Total area = 42 + 12
= 54 sq. metre

21. (1) Let the length, breadth and height of the box be x, y and z cm respectively.
$\therefore x + y + z = 12$ ...(i)
and $2(xy + yz + zx) = 94$ ...(ii)
$\therefore (x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$
$\Rightarrow 144 = x^2 + y^2 + z^2 + 94$
$\Rightarrow x^2 + y^2 + z^2 = 144 - 94 = 50$
$\therefore$ Maximum length of stick
$= \sqrt{x^2 + y^2 + z^2}$
$= \sqrt{50} = 5\sqrt{2}$ cm

22. (4) If the length of the edge of cube be x cm, then
diagonal $= \sqrt{3}x$ cm
$\therefore \sqrt{3}x = 8\sqrt{3} \Rightarrow x = 8$ cm
$\therefore$ Surface area of the cube
$= 6x^2 = 6 \times 8 \times 8 = 384$ sq. cm

23. (3) Let Breadth of room = x metre
Length = $2x$ metre
$\therefore$ Area of four walls
$= 2 \times h\,(l + b)$
$\Rightarrow 660 = 2 \times 11\,(2x + x)$
$= 22 \times 3x = 66x$
$\Rightarrow x = \frac{660}{66} = 10$
$\therefore$ Area of floor = $2x^2$
$= 2 \times 10^2 = 200$ sq.metre

24. (3) Maximum length of the pencil
$= \sqrt{8^2 + 6^2 + 2^2}$
$= \sqrt{64 + 36 + 4} = \sqrt{104}$
$= 2\sqrt{26}$ cm

25. (2) Length of the edge of the box
$= \sqrt[3]{3.375}$ metre
$= \sqrt[3]{1.5 \times 1.5 \times 1.5}$ metre
= 1.5 metre

26. (3) Diagonal of the cube
$= 6\sqrt{3}$ cm
$\therefore \sqrt{3} \times \text{edge} = 6\sqrt{3}$ cm
$\Rightarrow$ Edge = 6 cm
$\therefore$ Total surface area : Volume
$= 6 \times 6^2 : 6^3 = 1 : 1$

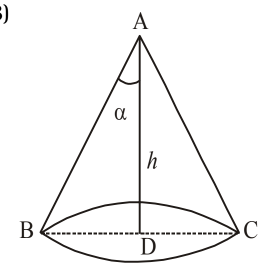
27. (2) Diagonal of cubical room
$= 35\sqrt{3}$ metre
$\therefore \sqrt{3} \times \text{edge} = 35\sqrt{3}$
$\Rightarrow$ Edge = 35 metre
$\Rightarrow$ Diameter of sphere
= 35 metre
$\Rightarrow$ Surface area of the sphere
$= 4\pi r^2$
$= 4 \times \frac{22}{7} \times \frac{35 \times 35}{4}$
= 3850 sq. metre

28. (4) Area of the floor
$= \frac{\text{Volume of room}}{\text{Height of room}}$
$= \frac{204}{6} = 34$ sq. m.

29. (2) Area of the base of mountain $= \pi r^2$
$1.54 \text{ km}^2 = \frac{22}{7} r^2$
$\Rightarrow \frac{1.54 \times 7}{22} = r^2$
$\Rightarrow 0.49 = r^2$
$\therefore r = 0.7$ km
Slant height = 2.5 km
$\therefore$ Height of the mountain
$= \sqrt{(2.5)^2 - (0.7)^2}$
$= \sqrt{6.25 - 0.49}$
$= \sqrt{5.76} = 2.4$ km

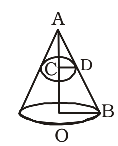
30. (3) Radius of base (r)
= 19.2 ÷ 2 = 9.6 m
Height (h) = 2.8 m
Slant height
$l = \sqrt{r^2 + h^2}$
$= \sqrt{(9.6)^2 + (2.8)^2}$
$= \sqrt{92.16 + 7.84} = \sqrt{100}$
= 10 m
$\therefore$ Required area = curved surface area = πrl
$= \frac{22}{7} \times 9.6 \times 10$ sq.m.
= 301.7 sq.m.

31. (3)



AD = h
$\tan\alpha = \frac{BD}{AD}$
$\Rightarrow BD = h\tan\alpha$
$\therefore$ Radius (r) = $h\tan\alpha$
$\therefore l = \sqrt{h^2 + r^2}$
$= \sqrt{h^2 + h^2\tan^2\alpha}$
$= \sqrt{h^2(1 + \tan^2\alpha)}$
$= \sqrt{h^2\sec^2\alpha} = h\sec\alpha$
$\therefore$ Curved Surface area of the circular cone = πrl
$= \pi \times h\tan\alpha \,.\, h\sec\alpha$
$= \pi h^2 \sec\alpha.\tan\alpha$

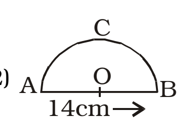
32. (3)

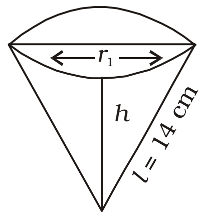


AC = 12 – 3 = 9 cm
OB = 6cm
Δ ACD ~ AOB
$\Rightarrow \frac{AC}{OA} = \frac{CD}{OB}$
$\Rightarrow \frac{9}{12} = \frac{CD}{6}$
$\Rightarrow CD = \frac{9}{12} \times 6 = 4.5cm$

33. (2) Let radius = $4x$ cm and slant height (l) = $7x$ cm
$\therefore \pi rl = \frac{22}{7} \times 4x \times 7x = 792$
$\Rightarrow x^2 = \frac{792 \times 7}{22 \times 4 \times 7} = 9$
$\therefore x = 3$
$\therefore$ Radius = 4 × 3 = 12 cm

34. (2)





Length (ACB) of semi-circular sheet = πr

$= \frac{22}{7} \times 14 = 44$ cm.

Slant height of the cone = 14 cm.
Circumference of the base of the cone $= 2\pi r_1 = \frac{44}{7} r_1$

$\Rightarrow 44 = \frac{44}{7} r_1 \Rightarrow r_1 = 7$ cm.

$\therefore h = \sqrt{l^2 - r_1^2} = \sqrt{14^2 - 7^2}$

$= 7\sqrt{3}$ cm.

$= 7 \times 1.732 \approx 12$cm.

35. (1) $\frac{r}{h} = \frac{4}{3} \Rightarrow \frac{r}{4} = \frac{h}{3} = k$

$\Rightarrow r = 4k;\ h = 3k$

$\therefore l = \sqrt{r^2 + h^2} = \sqrt{16k^2 + 9k^2}$

$= \sqrt{25k^2} = 5k$

$\therefore \frac{\text{Curved surface area}}{\text{Total surface area}}$

$= \frac{\pi r l}{\pi r (r + l)}$

$= \frac{l}{r + l} = \frac{5k}{4k + 5k} = \frac{5}{9}$

or 5 : 9

36. (3) Radius of the base $(r_1) = \frac{r}{4}$,

Slant height = r
$\therefore$ Curved surface area $= \pi r_1 l$

$= \frac{\pi r^2}{4}$ cm²

37. (4) Curved surface area of cone $= \pi r l$

$\therefore \frac{22}{7} \times 16 \times l = \frac{2992}{7}$

$\Rightarrow 22 \times 16 \times l = 2992$

$\Rightarrow l = \frac{2992}{22 \times 16} = 8.5$ metre

38. (2) $\frac{1}{3}\pi r^2 h = 1232$

$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times r^2 \times 24 = 1232$

$\Rightarrow r^2 = \frac{1232 \times 3 \times 7}{22 \times 24} = 49$

$\Rightarrow r = \sqrt{49} = 7$ cm.

$\therefore$ Slant height $(l) = \sqrt{h^2 + r^2}$

$= \sqrt{24^2 + 7^2} = \sqrt{625} = 25$ cm.

$\therefore$ Curved surface of cone $= \pi r l$

$= \frac{22}{7} \times 7 \times 25 = 550$ cm²

39. (4) Radius of the base of cone = r units

$\therefore$ Volume (v) $= \frac{1}{3}\pi r^2 h$

Curved surface area

$= \pi r \sqrt{h^2 + r^2}$

$\therefore\ 3\pi v h^3 - c^2 h^2 + 9v^2$

$= 3\pi \times \frac{1}{3}\pi r^2 h \times h^3$

$- \pi^2 r^2 (h^2 + r^2) h^2 + 9 \times \frac{1}{9}\pi^2 r^4 h^2$

$= \pi^2 r^2 h^4 - \pi^2 r^2 h^4 - \pi^2 r^4 h^2 + \pi^2 r^4 h^2$
$= 0$

40. (4) Let the radius of first sphere be r cm
and the radius of second sphere = (r + 2) cm
Now, Difference between surface area = 352
$\Rightarrow 4\pi \{(r + 2)^2 - r^2\} = 352$
or,

$4 \times \frac{22}{7}\{(r + 2 - r) + (r + 2 + r)\}$

= 352

$\Rightarrow 2 \times 2(r + 1) = \frac{352 \times 7}{4 \times 22}$

$\Rightarrow r + 1 = \frac{352 \times 7}{4 \times 4 \times 22}$

$\Rightarrow r + 1 = 7$
$\therefore r = 7 - 1 = 6$ cm

41. (4) $\frac{\text{Surface area of } A}{\text{Surface area of } B}$

$= \frac{4\pi r_1^2}{4\pi r_2^2} = \frac{r_1^2}{r_2^2}$

Where r_1 and r_2 are radii of spheres A and B respectively.

$= \frac{40 \times 40}{10 \times 10} = \frac{16}{1}$

$\Rightarrow 16 : 1$

42. (4) Volume of the sphere $= \frac{4}{3}\pi r^3$

or $\frac{4}{3}\pi r^3 = \frac{88}{21} \times (14)^3$

or $\frac{4}{3} \times \frac{22}{7} \times r^3 = \frac{4}{3} \times \frac{22}{7} \times (14)^3$

or $r = 14$
The curved surface of the sphere $= 4r\pi^2$

$= 4 \times \frac{22}{7} \times 14 \times 14 = 2464$ cm².

43. (2) $4\pi r^2 = 64\pi$ sq.cm.

$\Rightarrow r^2 = 16$
$\Rightarrow r = 4$ cm
$\therefore$ Diameter = 8 cm

44. (2) Let $r_1 = \frac{21}{2}$ cm and

$r_2 = \frac{17.5}{2}$ cm

$\therefore$ Required ratio

$= \frac{4\pi r_1^2}{4\pi r_2^2} = \frac{r_1^2}{r_2^2}$

$= \frac{\left(\frac{21}{2}\right)^2}{\left(\frac{17.5}{2}\right)^2} = \frac{21 \times 21}{17.5 \times 17.5} = 36:25$

45. (3) Here, we can treat the balloon as sphere.
Its circumference $= 2\pi r$
$\therefore 2\pi r_1 = 20$ ...(i)
$2\pi r_2 = 25$ ....(ii)
On dividing equation (ii) by (i),

$\Rightarrow \frac{2\pi r_2}{2\pi r_1} = \frac{25}{20} \Rightarrow \frac{r_2}{r_1} = \frac{5}{4}$

$\therefore$ Increase $= r_2 - r_1$

$= \frac{5}{4} r_1 - r_1 = \frac{1}{4} r_1$

$= \frac{1}{4} \times \frac{20}{2\pi} = \frac{5}{2\pi}$ [From (i)]

46. (3) Let the radius of the sphere be r units.
According to the question,

$\frac{4}{3}\pi r^3 = 4\pi r^2 \Rightarrow r = 3$ units

47. (2) Let Height of the cylinder = $2r$,
where r = radius of sphere.
Radius of cylinder = r

$\therefore \dfrac{\text{Surface area of sphere}}{\text{Curved surface area of cylinder}}$

$= \dfrac{4\pi r^2}{2\pi r \times 2r} = 1:1$

48. (3) Total curved surface area of hemisphere = $3\pi r^2$, where r = radius of hemisphere.
$\therefore\ 3\pi r^2 = 1848$

$\Rightarrow\ 3 \times \dfrac{22}{7} \times r^2 = 1848$

$\Rightarrow\ r^2 = \dfrac{1848 \times 7}{3 \times 22} = 196$

$\Rightarrow\ r = \sqrt{196} = 14$ cm.

Volume of hemisphere = $\dfrac{2}{3}\pi r^3$

$= \dfrac{2}{3} \times \pi \times 14 \times 14 \times 14\ \text{cm}^3$

$= \dfrac{5488}{3}\pi\ \text{cm}^3$

According to the question,
Volume of cone = Volume of hemisphere

$\Rightarrow \dfrac{1}{3}\pi r^2 h = \dfrac{5488}{3}\pi\ \text{cm}^3$

$\Rightarrow\ r^2 h = 5488$
$\Rightarrow\ 14 \times 14 \times h = 5488$

$\Rightarrow\ h = \dfrac{5488}{14 \times 14} = 28$ cm

49. (4) Required ratio

$= \dfrac{4\pi r_1^2}{4\pi r_2^2} = \left(\dfrac{r_1}{r_2}\right)^2 = \left(\dfrac{1}{4}\right)^2 = \dfrac{1}{16}$

or 1 : 16

50. (3) Volume of the solid metallic sphere = $\dfrac{4}{3}\pi r^3$

$= \dfrac{4}{3} \times \pi \times (8)^3$

$= \dfrac{2048}{3}\pi\ \text{cm}^3$

Let the radius of the each small sphere be x cm

$\therefore 64 \times \dfrac{4}{3}\pi x^3 = \dfrac{2048}{3}\pi$

$\Rightarrow x^3 = \dfrac{2048}{64 \times 4} = 8$

$\Rightarrow x = \sqrt[3]{8} = 2$ cm

$\therefore$ Required ratio = $4\pi.\ (8)^2 : 4\pi\ (2)^2$
= 64 : 4 = 16 : 1

51. (2) S_1 = surface area of sphere = $4\pi r^2$
S_2 = curved surface of the circumscribed cylinder
= $2\pi RH = 2\pi\ (2r)\ (2r) = 8\pi r^2$

$\therefore\ \dfrac{S_1}{S_2} = \dfrac{4\pi r^2}{8\pi r^2} = \dfrac{1}{2}$

$\Rightarrow S_1 = \dfrac{1}{2} S_2$

52. (1) Let the volume be $8x^3$ and $27x^3$
$\Rightarrow$ Their radius are 2x and 3x
$\therefore$ The ratio of their surface area = $4x^2 : 9x^2 = 4 : 9$

53. (1) $\dfrac{2}{3}\pi r^3 = 19404$

$\Rightarrow\ \dfrac{2}{3} \times \dfrac{22}{7} \times r^3 = 19404$

$\Rightarrow\ r^3 = \dfrac{19404 \times 3 \times 7}{2 \times 22} = 9261$

$\Rightarrow\ r = \sqrt[3]{21 \times 21 \times 21} = 21$ cm.
$\therefore$ Total surface area = $3\pi r^2$

$= 3 \times \dfrac{22}{7} \times 21 \times 21$

= 4158 sq. cm.

54. (4) $\dfrac{4}{3}\pi r^3 = \dfrac{2}{3}\pi r_1^3$
[r_1 being the radius of hemisphere]

$\Rightarrow 2r^3 = r_1^{\ 3} \Rightarrow \dfrac{r}{r_1} = \dfrac{1}{2^{\frac{1}{3}}}$

$\therefore$ Required ratio $= \dfrac{4\pi r^2}{2\pi r_1^2}$

$= 2\left(\dfrac{r}{r_1}\right)^2 = 2\left(\dfrac{1}{2^{\frac{1}{3}}}\right)^2$

$= 2 \times 2^{-\frac{2}{3}} : 1 = 2^{\frac{1}{3}} : 1$

55. (3) Original surface area of sphere = $4\pi r^2$
$\Rightarrow$ Surface area of sphere
= $4\pi(2r)^2 = 16\pi r^2$
= $4 \times 4\pi r^2$ = 4 (original surface area)

56. (3) Curved surface area of hemisphere
= $2\pi r^2$

$= 2 \times \dfrac{22}{7} \times 11 \times 11$

= 760.57 sq.cm.

57. (2) If the radius of hemisphere be r cm, then
$2\ \pi r^2 + \pi r^2 = 27\ \pi$
$\Rightarrow 3\ \pi r^2 = 27\ \pi$
$\Rightarrow 3\ r^2 = 27$
$\Rightarrow r^2 = 9$
$\therefore\ r = \sqrt{9} = 3$ cm

58. (3) Perimeter of triangle

$S = \dfrac{9 + 12 + 15}{2} = 18$ cm

$\therefore$ Area of triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{18(18-9)(18-12)(18-15)}$

$= \sqrt{18 \times 9 \times 6 \times 3}$
= 54 sq.cm.

$\therefore$ Total surface area of the prism = Perimeter of base × height + 2 × Area of base
= 36 × 5 + 2 × 54 = 288 sq.cm.

59. (3) Volume of right prism = Area of the base × height
$\Rightarrow 10380 = 173 \times h$

$\Rightarrow\ h = \dfrac{10380}{173} = 60$ cm

Now, Area of triangle

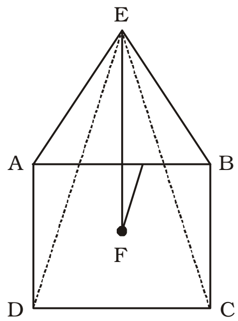
$= \dfrac{\sqrt{3}}{4} \times (\text{Side})^2$

$\Rightarrow 173 = \dfrac{\sqrt{3}}{4} \times (\text{Side})^2$

$\therefore$ Side $= \sqrt{\dfrac{173 \times 4}{\sqrt{3}}} = \sqrt{\dfrac{173 \times 4}{1.73}}$

= 20 cm
$\Rightarrow$ Perimeter = 3 × 20 = 60 cm
$\therefore$ Area of the lateral surface
= Perimeter of base × height
= 60 × 60 = 3600 sq.cm.

60. (2)



Height of the triangle

$= \sqrt{15^2 + 8^2}$

$= \sqrt{225 + 64} = \sqrt{289}$

= 17 cm

$\therefore$ Area of the lateral surface of pyramid = 4 × Area of triangle

$= 4 \times \frac{1}{2} \times$ base × height

$= 4 \times \frac{1}{2} \times 16 \times 17 = 544$ sq.cm.

61. (1) Let the length of each side of base be x metres, then

$\frac{1}{2} \times$ perimeter of base × slant height = 12

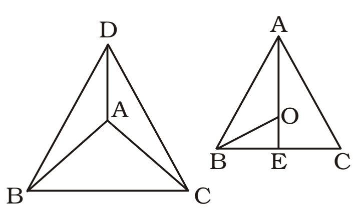
$\Rightarrow \frac{1}{2} \times 4x \times 4 = 12$

$\Rightarrow x = \frac{12}{8} = \frac{3}{2}$ metre

$\therefore$ Area of the base $= \frac{9}{4}$ sq. metre

$\therefore$ Required ratio $= 12 : \frac{9}{4} = 16 : 3$

62. (4)



AB = $10\sqrt{3}$ cm

BE = $5\sqrt{3}$ cm

AE = $\sqrt{\left(10\sqrt{3}\right)^2 - \left(5\sqrt{3}\right)^2}$

$= \sqrt{225} = 15$ cm

OE = $\frac{1}{3} \times 15 = 5$ cm

Let the height of pyramid be h cm, then

Slant height

$= \sqrt{h^2 + 5^2} = \sqrt{h^2 + 25}$

Now, Total surface area = Area of the 3 faces + Area of base

$= 3\left[\frac{1}{2}\text{base} \times \text{slant height}\right] + \text{Area}$ of the base

Total surface area

$= \frac{1}{2} \times$ (perimeter of base) × (slant height) + Area of base [base of all the 3 triangular faces is the edge of the equilateral triangle].

$\Rightarrow 270\sqrt{3} = \frac{1}{2} \times 30\sqrt{3} \times \sqrt{h^2 + 25}$

$+ \frac{\sqrt{3}}{4} \times \left(10\sqrt{3}\right)^2$

$\Rightarrow$

$270\sqrt{3} = 15\sqrt{3}\sqrt{h^2 + 25} + 75\sqrt{3}$

$\Rightarrow 15\sqrt{3}\sqrt{h^2 + 25} = 195\sqrt{3}$

$\Rightarrow \sqrt{h^2 + 25} = 13$

$\Rightarrow h^2 + 25 = 169$

$\Rightarrow h^2 = 169 - 25 = 144$

$\Rightarrow h = \sqrt{144} = 12$ cm

63. (1) Area of the base of prism

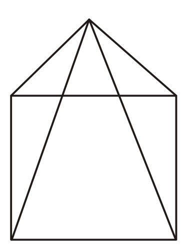
$= \frac{\sqrt{3}}{4} \times 6 \times 6 = 9\sqrt{3}$ sq.cm.

$\therefore$ Volume = Area of base × height

$\Rightarrow 81\sqrt{3} = 9\sqrt{3} \times$ height

$\Rightarrow$ height $= \frac{81\sqrt{3}}{9\sqrt{3}} = 9$ cm

64. (4)



Side of square base

$= \frac{1}{\sqrt{2}} \times 10\sqrt{2} = 10$ cm

Slant height = $\sqrt{5^2 + 12^2}$

= 13 cm

$\therefore$ Area of the lateral surface

$= \frac{1}{2} \times$ perimeter of base × slant height

$= \frac{1}{2} \times 40 \times 13 = 260$ sq. cm.

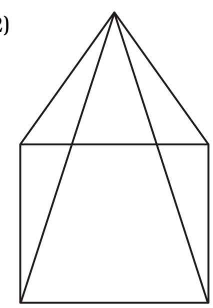
65. (4) Total surface area = Perimeter of base ×height + 2 × area of base

$= 36 \times 10 + 2 \times \frac{\sqrt{3}}{4} \times 12 \times 12$

$= 360 + 72\sqrt{3}$

$= 72 (5 + \sqrt{3})$ sq. cm

66. (2)



Lateral surface area

$= \frac{1}{2} \times$ perimeter of base × slant height

[$\because$ Slant height = $\sqrt{8^2 + 15^2}$

$= \sqrt{64 + 225} = \sqrt{289} = 17$ cm]

$\therefore$ Required area $= \frac{1}{2} \times 64 \times 17$

= 544 sq.cm.

67. (1) Total surface area = Lateral surface area + 2 Area of base = Area of base × height + area of base

$\Rightarrow 360 = 30 \times h + \frac{1}{2} \times 5 \times 12$

$\Rightarrow 360 - 30 = 30 \times h$

$\Rightarrow 30h = 330$

$\Rightarrow h = \frac{300}{30} = 10$ cm

68. (2) According to the question
Base of hemisphere
= Base of cone
i.e. radius of hemisphere
= radius of cone
...(i)
and height of hemisphere
= height of cone
...(ii)
We know that height of hemisphere = radius of hemisphere
⇒ height of cone = radius of hemisphere
[From (i)]
⇒ height of cone = radius of cone

[From (ii)]
Now,
Curved surface area of hemisphere $= 2\pi r^2$
Curved surface area of cone

$= \pi r\sqrt{r^2+h^2}$

$= \pi r\sqrt{r^2+r^2}\,(r=h)$

$= \pi r\sqrt{2r^2} = \pi r \times \sqrt{2}\ r = \sqrt{2}\ \pi\ r^2$

∴ Ratio of curved surface area of hemisphere and cone

$= 2\pi r^2 : \sqrt{2}\pi r^2 = 2 : \sqrt{2} = \sqrt{2} : 1$

69. (4) Let Height of the cylinder $= 2r$
Curved surface area of the cylinder
$= 2\pi RH$
∴ Required ratio
$= 4\pi r^2 : 2\pi \times r \times 2r = 1 : 1$

70. (2) $\dfrac{\text{Volume of sphere}}{\text{Volume of cylinder}}$

$= \dfrac{\frac{4}{3}\pi r^3}{\pi r^2 h} = 1 \Rightarrow \dfrac{r}{h} = \dfrac{3}{4}$

$\therefore \dfrac{\text{Curved surface area of cylinder}}{\text{Surface area of sphere}}$

$= \dfrac{2\pi rh}{4\pi r^2} = \dfrac{h}{2r} = \dfrac{1}{2} \times \dfrac{4}{3} = \dfrac{2}{3}$

or 2 : 3

71. (1) Total area of the canvas
$= 2\pi rh + \pi rl = \pi r\,(2h + l)$

$= \dfrac{22}{7} \times \dfrac{105}{2}(2 \times 3 + 63)$

$= \dfrac{22}{7} \times \dfrac{105}{2} \times 69$

= 11385 sq.metre

72. (3) Let Radius of the base $= r$ units and height $= h$ units

$\Rightarrow \dfrac{\text{Curved surface of cylinder}}{\text{Curved surface of cone}}$

$= \dfrac{2\pi rh}{\pi rl}$

$\Rightarrow \dfrac{8}{5} = \dfrac{2h}{l}$

$\Rightarrow \dfrac{4}{5} = \dfrac{h}{\sqrt{h^2+r^2}}$

$\Rightarrow \dfrac{16}{25} = \dfrac{h^2}{h^2+r^2}$

$\Rightarrow \dfrac{h^2+r^2}{h^2} = \dfrac{25}{16}$

$\Rightarrow 1 + \dfrac{r^2}{h^2} = \dfrac{25}{16}$

$\Rightarrow \dfrac{r^2}{h^2} = \dfrac{25}{16} - 1 = \dfrac{9}{16}$

$\Rightarrow \dfrac{r}{h} = \dfrac{3}{4}$ or 3 : 4

73. (1) Slant height of cone

$l = \sqrt{6^2+8^2}$

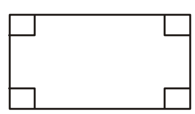
$= \sqrt{36+64} = \sqrt{100}$

= 10 cm

∴ Curved surface of cylinder : Curved surface of cone
$= 2\pi rh : \pi rl$
$= 2h : l = 16 : 10 = 8 : 5$

74. (3) Radius of cylinder = r units and height = r units
[∵ height of hemisphere = radius]
∴ Required ratio
$= 2\pi r^2 + 2\pi r^2 : 2\pi r^2 + \pi r^2$
= 4 : 3

75. (2)



Length of box = 24 –(2 × 3)
= 18 cm
Width of box $= 18 - 2 \times 3 = 12$ cm
Height of box = 3 cm
∴ Surface area of box
= 18 × 12 + 2 (12 × 3 + 3 × 18)
= 216 + 180 = 396 sq. cm

76. (1) Volume of all three cubes
$= (4^3 + 5^3 + 6^3)$ cu.cm.
= (64 + 125 + 216) cu.cm.
= 405 cu.cm.
∴ Volume of new cube
= 405 – 62
= 343 cu.cm.

∴ Edge of cube $= \sqrt[3]{343} = 7$ cm.
∴ Surface area $= 6 \times 7^2$
= 294 sq. cm.

77. (4) Percentage increase

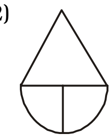
$= \left(50 + 50 + \dfrac{50 \times 50}{100}\right)\% = 125\%$

78. (4) Total surface of the tetrahedron

$= 4 \times \dfrac{\sqrt{3}}{4} \times 12^2$

$= 144\sqrt{3}$ sq.cm.

79. (2)



Total surface area of the toy
$= 2\pi r^2 + \pi rl$

$= \pi r\left(2r + \sqrt{r^2+h^2}\right)$

$= \dfrac{22}{7} \times 3\left(2 \times 3 + \sqrt{3^2+4^2}\right)$

$= \dfrac{22}{7} \times 3\ (6 + 5)$

$= \dfrac{22 \times 3 \times 11}{7} = 103.71$ sq.cm.

80. (2) Length of room $= \sqrt{48}$

$= 4\sqrt{3}$ metre

∴ Diagonal $= \sqrt{3 \times \left(4\sqrt{3}\right)^2}$

$= \sqrt{3 \times 16 \times 3} = 12$ metre

81. (3) Radius of sphere $= r$ units

$\therefore \dfrac{\text{Surface area of sphere}}{\text{Surface area of hemisphere}}$

$= \dfrac{4\pi r^2}{3\pi r^2} = \dfrac{4}{3} = 4 : 3$

82. (3) Surface area of sphere
$= 4\pi r^2$

$\therefore 4 \times \dfrac{22}{7} \times r^2 = 346.5$

$\Rightarrow 4 \times 22 \times r^2 = 346.5 \times 7$

$\Rightarrow r^2 = \dfrac{346.5 \times 7}{4 \times 22} = 27.5625$

$\therefore r = \sqrt{27.5625} = 5.25$ cm

83. (3) Hypotenuse of base

$= \sqrt{5^2 + 12^2}$

$= \sqrt{25+144} = \sqrt{169}$

= 13 cm

$\therefore$ Surface area

$= h(a + b + c)$

= 10 (5 + 12 + 13) = 300 sq.cm.

Area of base $= \frac{1}{2} \times 5 \times 12$

= 30 sq.cm.

$\therefore$ Total surface area of lateral surfaces

= 300 + 30

= 330 sq.cm.

84. (2) Length = $5x$ cm
Breadth = $3x$ cm
Total surface area of parallelopiped
$= 2(l \times b + b \times h + h \times l)$
$= 2(5x \times 3x + 3x \times 6 + 6 \times 5x)$
$= 2(15x^2 + 18x + 30x)$
$= 2(15x^2 + 48x)$
$\therefore 2(15x^2 + 48x) = 558$

$\Rightarrow 15x^2 + 48x = \frac{558}{2} = 279$

$\Rightarrow 5x^2 + 16x = 93$
$\Rightarrow 5x^2 + 16x - 93 = 0$
$\Rightarrow 5x^2 + 31x - 15x - 93 = 0$
$\Rightarrow x(5x + 31) - 3(5x + 31) = 0$
$\Rightarrow (x - 3)(5x + 31) = 0$
$\Rightarrow x = 3$
$\therefore$ Length $= 5x = 5 \times 3 = 15$ cm
= 1.5 dm

85. (2) Required area $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 3.5 \times 25$

= 550 sq. cm.

86. (3) Let, length $= a$ cm.

breadth $= b$ cm.

height $= c$ cm.

$\therefore a + b + c = 24$ --- (i)

and $\sqrt{a^2 + b^2 + c^2} = 15$

$\Rightarrow a^2 + b^2 + c^2 = 15 \times 15 = 225$ --- (ii)

$\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
$\Rightarrow 24^2 = 225 + 2(ab + bc + ca)$
$\Rightarrow 576 = 225 + 2(ab + bc + ca)$
$\Rightarrow 2(ab + bc + ca) = 576 - 225$
= 351 sq.cm. = Total surface area

87. (3) Length of parallelopiped
$= 3x$ cm
breadth $= 4x$ cm and height
$= 6x$ cm.

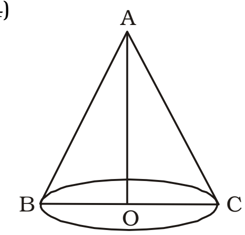
$\therefore$ Its volume = 576 cu.cm.
$\Rightarrow 3x \times 4x \times 6x = 576$
$\Rightarrow 72x^3 = 576$

$\Rightarrow x^3 = \frac{576}{72} = 8$

$\Rightarrow x = \sqrt[3]{8} = 2$

$\therefore$ Total surface area
$= 2(l \times b + b \times h + h \times l)$
$= 2(3x \times 4x + 4x \times 6x + 6x \times 3x)$
$= 2(12x^2 + 24x^2 + 18x^2)$
$= 108x^2$
$= 108 \times 2^2 = 108 \times 4 = 432$ sq. cm.

88. (4)



OB = 3 cm

OA = 4 cm

$\therefore AB = l$

$= \sqrt{3^2 + 4^2} = \sqrt{9+16}$

$= \sqrt{25} = 5$ cm

$\therefore$ Total surface area $= \pi rl + \pi r^2$
$= \pi r(l + r)$

$= \frac{22}{7} \times 3(5+3)$

$= \frac{22}{7} \times 3 \times 8$

= 75.4 sq.cm.

89. (1) Curved surface area of first cone $= \pi r_1 l_1$
Curved surface area of second cone $= \pi r_2 l_2$
$\pi r_1 l_1 = 2\pi r_2 l_2$
$\Rightarrow r_1 l_1 = 2r_2 l_2$

$\Rightarrow \frac{r_1}{r_2} = \frac{2l_2}{l_1} = \frac{2 \times 2l_1}{l_1} = \frac{4}{1} = 4:1$

90. (1) Whole surface of the remaining solid
$= 2\pi rh + \pi r^2 + \pi rl$
where l = slant height of cone.

$l = \sqrt{r^2 + h^2} = \sqrt{3^2 + 4^2}$

$= \sqrt{9+16} = \sqrt{25} = 5$ cm

$\therefore$ Required area
$= (2 \times \pi \times 4 \times 3 + \pi \times 3 \times 3 + \pi \times 3 \times 5)$ square cm.
$= (24\pi + 9\pi + 15\pi)$ square cm.
$= 48\pi$ square cm.

91. (4) Let the thickness of wood
$= x$ cm.

$\therefore$ Area of the inner surface
$= 2(9 - 2x)(10 - 2x) + 2(9 - 2x)(7 - 2x) + 2(7 - 2x)(10 - 2x) = 262$
Putting $x = 1$, the equation is satisfied.

92. (3) Total surface area

$= 4 \times \frac{\sqrt{3}}{4} \times (1)^2 = \sqrt{3}$ sq.cm.

93. (4) Number of paving stones

$= \frac{\text{Area of courtyard}}{\text{Area of a stone}}$

$= \frac{30 \times 17.5}{2.5 \times 2} = 105$

94. (4) Area of the base of conical tent
= 346.5 sq. metre
$\therefore \pi r^2 = 346.5$

$\Rightarrow \frac{22}{7} \times r^2 = 346.5$

$\Rightarrow r^2 = \frac{346.5 \times 7}{22} = 110.25$

$\Rightarrow r = \sqrt{110.25} = 10.5$ metre

$\therefore$ Slant height $= \sqrt{h^2 + r^2}$

$= \sqrt{(14)^2 + (10.5)^2}$

$= \sqrt{196 + 110.25}$

$= \sqrt{306.25} = 17.5$ metre

$\therefore$ Area of curved surface of the tent $= \pi rl$

$= \frac{22}{7} \times 10.5 \times 17.5$

= 577.5 sq. metre
$\therefore$ Length of canvas

$= \frac{577.5}{\frac{75}{100}} = \frac{577.5 \times 100}{75}$

$= \frac{57750}{75} = 770$ metre

95. (4) Let the radius of the base of conical tent be r metre and its height be h metre.
$\therefore$ Area of base $= \pi r^2$
= 16 × 5 = 80
......(i)

Volume $= \frac{1}{3}\pi r^2 h$

= 5 × 100 cu. metre
......(ii)
On dividing equation (ii) by (i),

$\frac{1}{3}\frac{\pi r^2 h}{\pi r^2} = \frac{5 \times 100}{80}$

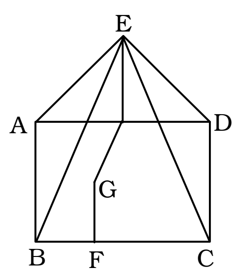
$\Rightarrow \frac{h}{3} = \frac{25}{4}$

$\Rightarrow h = \frac{75}{4} = 18.75$ metre.

96. (4) Whole surface area of a brick
$= 2\ (l \times b + b \times h + h \times l)$
$= 2\ (22.5 \times 10 + 10 \times 7.5 + 7.5 \times 22.5)$
$= 2\ (225 + 75 + 0.75 \times 225)$
$= 2 \times 75\ (3 + 1 + 0.75 \times 3)$
$= 150 \times 6.25$
$= 937.5$ sq. cm.
$\therefore$ Number of bricks
$= \dfrac{9.375 \times 100 \times 100}{937.5} = 100$

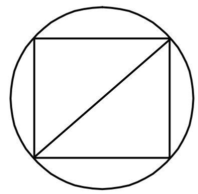
97. (3) Length of park $= 3x$ metre (let)
Breadth $= 2x$ metre
Perimeter of park = Distance covered by cyclist
$= \dfrac{12 \times 8}{60} = \dfrac{8}{5}$ km.
$= \left(\dfrac{8}{5} \times 1000\right)$ metre
$= 1600$ metre
According to the question,
$2\ (3x + 2x) = 1600$
$\Rightarrow 10x = 1600 \Rightarrow x = \dfrac{1600}{10} = 160$
$\therefore$ Area of the park $= 3x \times 2x$
$= 6x^2 = 6 \times (160)^2$
$= 153600$ sq. metre

98. (4)



Slant height = BE $= \sqrt{12^2 + 5^2}$
$= \sqrt{144 + 25} = \sqrt{169} = 13$ cm.
$\therefore$ Lateral surface of pyramid
$= \dfrac{1}{2} \times$ perimeter of base $\times$ slant height
$= \dfrac{1}{2} \times 40 \times 13 = 260$ sq. cm.
Area of base $= 10 \times 10$
$= 100$ sq. cm.
$\therefore$ Total surface area
$= (260 + 100)$ sq. cm.
$= 360$ sq. cm.

99. (1)



Diagonal of cube = Diameter of sphere
$= 6\sqrt{3} \times 2 = 12\sqrt{3}$ cm.
$\therefore$ Edge of cube $= \dfrac{12\sqrt{3}}{\sqrt{3}}$
$= 12$ cm.
$\therefore$ Surface area of cube
$= 6 \times (\text{edge})^2$
$= (6 \times 12 \times 12)$ sq. cm.
$= 864$ sq. cm.

100. (4) Curved surface area of hemisphere $= 2\pi r^2$
Curved surface area of cone
$= \pi rl$
$= \pi r\sqrt{r^2 + r^2}$
$[\because h = r]$
$= \sqrt{2}\pi r^2$
$\therefore$ Required ratio
$= 2\pi r^2 : \sqrt{2}\pi r^2 = \sqrt{2} : 1$

101. (3) Curved surface area of cylinder $= 2\pi RH$
$\therefore$ According to the question,
$2\pi rH = 4\pi rh$
$\Rightarrow H = 2h$ units

102. (1) Inner and outer surface areas of the bowl $= 4\pi r^2$
$= 4 \times \dfrac{22}{7} \times 3.5 \times 3.5$
$= 154$ sq. cm.
$\therefore$ Cost of painting
$= 154 \times \dfrac{5}{10}$
$=$ Rs. 77

103. (4) Total surface area of right circular cylinder $= 2\pi rh + 2\pi r^2$
$= 2\pi r\ (h + r)$
$= 2 \times \dfrac{22}{7} \times 7\ (20 + 7)$
$= 2 \times 22 \times 27 = 1188$ sq. cm.

104. (4) Initial radius of sphere $= r$ cm (let).
According to the question,
$4\pi\ (r + 2)^2 - 4\pi r^2 = 352$
$\Rightarrow 4\pi\ ((r + 2)^2 - r^2) = 352$
$\Rightarrow r^2 + 4r + 4 - r^2 = \dfrac{352}{4\pi}$
$= \dfrac{352}{4 \times \dfrac{22}{7}}$
$\Rightarrow 4r + 4 = \dfrac{352 \times 7}{4 \times 22} = 28$
$\Rightarrow 4r = 28 - 4 = 24$
$\Rightarrow r = \dfrac{24}{4} = 6$ cm.

105. (3) Levelled area in one revolution of roller $= 2\pi rh$
$= 2 \times \dfrac{22}{7} \times 42 \times 120$
$= 31680$ sq. cm.
Area levelled in 500 revolutions
$= (31680 \times 500)$ sq. cm.
$= 15840000$ sq. cm.
$= 1584$ sq. metre
$\therefore$ Required cost
= Rs. (1584×1.5)
= Rs. 2376

106. (4) Internal surface area of hemispherical bowl $= 2\pi r^2$
$= (2 \times 3.14 \times 6 \times 6)$ sq.cm.
$= 226.08$ sq.cm.

107. (1) Surface area of sphere
$= 4\pi r^2$
$\Rightarrow 4\pi r^2 = 616$
$\Rightarrow 4 \times \dfrac{22}{7} \times r^2 = 616$
$\Rightarrow r^2 = \dfrac{616 \times 7}{4 \times 22} = 49$
$\Rightarrow r = \sqrt{49} = 7$ cm
$\therefore$ Volume of sphere $= \dfrac{4}{3}\pi r^3$
$= \dfrac{4}{3} \times \dfrac{22}{7} \times 7 \times 7 \times 7$
$= \dfrac{4312}{3} = 1437\dfrac{1}{3}$ cu.cm.

108. (4) Volume of each smaller sphere
$= \dfrac{4}{3}\pi r^3$
$= \dfrac{4}{3}\pi \times (3)^3 = 36\pi$ cu.cm.
If the radius of larger sphere be R cm, then
$\dfrac{4}{3}\pi R^3 = 1000 \times 36\pi$
$\Rightarrow R^3 = \dfrac{1000 \times 36 \times 3}{4}$

$= 1000 \times 3 \times 3 \times 3$

$\therefore$ R $= \sqrt[3]{1000 \times 3 \times 3 \times 3}$

$= 10 \times 3 = 30$ cm.

$\therefore$ Its diameter $= (2 \times 30)$ cm.

$= 60$ cm

109. (3) According to the question,

$\pi R^2 = 16\pi$

$\Rightarrow R^2 = 16$

$\Rightarrow R = \sqrt{16} = 4$ cm.

$\therefore$ Required area $= \pi (R + r)l$

$= \pi (4 + 2) \times 6$

$= 36\pi$ sq. cm.

110. (2) Radius of first sphere

$= 2r$ cm.

Radius of second sphere

$= r$ cm.

According to the question,

$4\pi (2r)^2 = \frac{4}{3}\pi r^3$

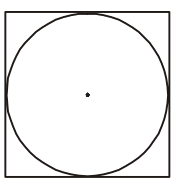
$\Rightarrow 16\pi r^2 = \frac{4}{3}\pi r^3$

$\Rightarrow 12 = r$

$\therefore$ Radius of first sphere

$= 24$ cm.

111. (1)



Radius of the largest sphere

$= \frac{18}{2} = 9$ cm.

$\therefore$ Area of sphere $= 4\pi r^2$

$= 4\pi \times 9 \times 9$

$= 972\pi$ sq. cm.

112. (2) Slant height of pyramid

$= \sqrt{5^2 + 12^2} = \sqrt{25 + 144}$

$= \sqrt{169} = 13$ cm.

Lateral surface area of pyramid

$= \frac{1}{2} \times$ perimeter of base $\times$ slant height

$= \frac{1}{2} \times 4 \times 10 \times 13$

$= 260$ sq. cm.

Area of base $= 10 \times 10$

$= 100$ sq.cm.

$\therefore$ Total surface area

$= 260 + 100 = 360$ sq.cm.

113. (3) Total surface area of prism

= Perimeter of base × height + 2 × area of base

$10 = 4x \times 2 + 2x^2$

where x = side of square

$\Rightarrow x^2 + 4x - 5 = 0$

$\Rightarrow x^2 + 5x - x - 5 = 0$

$\Rightarrow x (x + 5) - 1 (x + 5) = 0$

$\Rightarrow (x - 1) (x + 5) = 0$

$\Rightarrow x = 1$ because $x \neq -5$

$\therefore$ Volume of prism

= Area of base × height

$= 1 \times 1 \times 2 = 2$ cu.cm.

114. (2) Total surface area of prism

$= \frac{151.20}{0.20} = \frac{1512}{2}$

$= 756$ sq.cm.

Hypotenuse of the triangular base

$= \sqrt{9^2 + 12^2} = \sqrt{81 + 144}$

$= \sqrt{225}$

$= 15$ cm.

$\therefore$ Perimeter of base $= 9 + 12 + 15 = 36$ cm.

$\therefore$ Total surface area = Perimeter of base × height + 2 × area of base

$\Rightarrow 756 = 36 \times h + 2 \times \frac{1}{2} \times 9 \times 12$

$\Rightarrow 756 = 36h + 108$

$\Rightarrow 36h = 756 - 108 = 648$

$\Rightarrow h = \frac{648}{36} = 18$ cm.

115. (2) Surcface area of cylindrical tunnel $= 2\pi rh$

$= \left(2 \times \pi \times \frac{5}{2} \times 10\right)$ sq.m.

$= 50\pi$ sq.m.

116. (1) Slant height $= l$ units Radius $= r$ units

$\therefore \; l = \sqrt{r^2 + h^2}$, $V = \frac{1}{3}\pi r^2 h$,

$C = \pi rl$

$\therefore 3\pi Vh^3 - C^2h^2 + 9V^2$

$= 3\pi \times \frac{1}{3}\pi r^2 h \times h^3 - (\pi rl)^2 h^2$

$+ 9\left(\frac{1}{3}\pi r^2 h\right)^2$

$= \pi^2 r^2 h^4 - \pi^2 r^2 l^2 h^2 + \pi^2 r^4 h^2$

$= \pi^2 r^2 h^4 - \pi^2 r^2 h^2 (r^2 + h^2) + \pi^2 r^4 h^2$

$= \pi^2 r^2 h^4 - \pi^2 r^4 h^2 - \pi^2 r^2 h^4 + \pi^2 r^4 h^2$

$= 0$

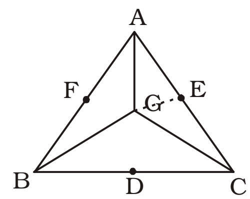
117. (4) Area of trapezium

$= \frac{1}{2}$ (sum of parallel sides) × perpendicular distance

$= \frac{1}{2}(20 + 16) \times 10$

$= \frac{1}{2} \times 36 \times 10 = 180$ sq. metre

118. (2)



Medians intersect at point G.

$\therefore \Delta$ ABG $= \Delta$ BGC $= \Delta$ AGC.

GE bisects Δ CGE.

$\therefore \Delta$ AGE $= \Delta$ CGE

$\therefore$ Area of Δ CGE

$= \frac{1}{6} \times$ Area of Δ ABC

$= \frac{1}{6} \times 36 = 6$ sq. cm.

119. (1) Diagonal of the cuboid

$= \sqrt{l^2 + b^2 + h^2}$

$= \sqrt{5^2 + 4^2 + 3^2}$

$= \sqrt{25 + 16 + 9} = \sqrt{50}$

$= 5\sqrt{2}$ cm.

120. (3) Volume of the earth taken out

$= \pi r^2 h = \pi \times \left(\frac{3}{2}\right)^2 \times 14$

$= \frac{63}{2}\pi$ cubic metre

Ex–radius of embankment

$= \frac{3}{2} + 4 = \frac{11}{2}$ metre

$\therefore$ Volume of embankment

$= \pi(R^2 - r^2) \times h_1$

$= \pi\left(\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2\right) \times h_1$

$= \pi\left(\frac{11}{2} + \frac{3}{2}\right)\left(\frac{11}{2} - \frac{3}{2}\right) \times h_1$

$= \pi \times 7 \times 4\, h_1$

$= 28\pi h_1$ cu. metre

$\therefore 28\pi h_1 = \frac{63}{2}\pi$

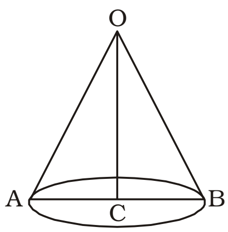
$\Rightarrow h_1 = \frac{63}{2 \times 28} = 1.125$ metre

121. (2) Radius of first sphere
= $2r$ units (let).
$\therefore$ Radius of second sphere
= r units
Curved surface of first sphere = $4\pi R^2 = 4\pi (2r)^2$
= $16\pi r^2$ sq. units.
Volume of second sphere
= $\frac{4}{3}\pi r^3$ cu. units
According to the question,
$\frac{4}{3}\pi r^3 = 16\pi r^2$
$\Rightarrow 4r = 16 \times 3$
$\Rightarrow r = \frac{16 \times 3}{4} = 12$ units
$\therefore$ Radius of first sphere
= 24 units

122. (3) Slant height of cone (l)
= $\sqrt{r^2 + h^2}$
= $\sqrt{30^2 + 40^2}$
= $\sqrt{900 + 1600}$
= $\sqrt{2500}$ = 50 cm.
$\therefore$ Curved surface area of cone = πrl
= $(\pi \times 30 \times 50)$ sq. cm.
= $1500\ \pi$ sq. cm.
If the radius of sphere be R cm, then
$4\pi R^2 = 1500\pi$
$\Rightarrow R^2 = \frac{1500}{4} = 375$
$\Rightarrow R = \sqrt{375} = \sqrt{5 \times 5 \times 15}$
= $5\sqrt{15}$ cm.

123. (1) Total surface area = Lateral surface area + area of base
$\Rightarrow$ 340 = Lateral surface area + 100
$\Rightarrow$ Lateral surface area
= 340 – 100 = 240 sq. cm.
Area of each lateral surface
= 30 sq. cm.
$\therefore$ Number of lateral surfaces = $\frac{240}{30} = 8$

124. (3)



AC = $\frac{21}{2}$ metre
OC = 14 metre
$\therefore$ Slant height (l)
= $\sqrt{AC^2 + CO^2}$
= $\sqrt{\left(\frac{21}{2}\right)^2 + (14)^2}$
= $\sqrt{\frac{441}{4} + 196}$
= $\sqrt{\frac{441 + 784}{4}} = \sqrt{\frac{1225}{4}}$
= $\frac{35}{2}$ metre
$\therefore$ Curved surface area = πrl
= $\left(\frac{22}{7} \times \frac{21}{2} \times \frac{35}{2}\right)$ sq. metre
= 577.5 sq. metre
$\therefore$ Total expenditure on painting = Rs. (577.5 × 6)
= Rs. 3465

125. (3) Curved surface area of cylinder = $2\pi rh$
$\Rightarrow 2\pi rh = 1386$
$\Rightarrow 2 \times \frac{22}{7} \times r \times 21 = 1386$
$\Rightarrow 44 \times 3 \times r = 1386$
$\Rightarrow r = \frac{1386}{44 \times 3} = 10.5$ cm.

126. (1) Height of cylinder = 4 cm.
Total surface area = $2\pi r (r + h)$
$\therefore 2\pi r (r + h) = 8\pi$
$\Rightarrow r (r + 4) = 4$
$\Rightarrow r^2 + 4r - 4 = 0$
$\Rightarrow r = \frac{-4 \pm \sqrt{16 + 16}}{2}$
= $\frac{-4 \pm \sqrt{32}}{2}$
= $\frac{-4 \pm 4\sqrt{2}}{2}$
= $-2 + 2\sqrt{2}$
because $r \neq -2 - 2\sqrt{2}$
Note : If $ax^2 + bx + c = 0$, then x
= $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

127. (2) Surface area of milk pot.
= $2\pi rh + \pi r^2$
= $\pi r (2h + r)$
= $\frac{\pi h}{2}\left(2h + \frac{h}{2}\right)$
= $\frac{5\pi h^2}{4}$
$\therefore \frac{5}{4} \times \frac{22}{7} \times h^2 = 616$
$\Rightarrow h^2 = \frac{616 \times 4 \times 7}{5 \times 22} = \frac{28 \times 28}{5}$
$\therefore$ Volume of milk = $\pi r^2 h$
= $\frac{22}{7} \times \frac{h^2}{4} \times h$
= $\frac{22}{28} \times \frac{28 \times 28 \times 28}{5 \times \sqrt{5}}$
= $\frac{22 \times 28 \times 28 \times \sqrt{5}}{25}$
= $\frac{22 \times 28 \times 28 \times 2.23}{25}$
= 1538.5 cu. cm.
= 1.54 litres
= 1.53 litres (Approx.)

128. (3) Volume of copper sphere
= $\frac{4}{3}\pi r^3$
= $\frac{4}{3}\pi (21)^3$ cu. cm.
Volume of cylindrical rod
= $\pi R^2 H = \pi R^2 \times 7$ cu. cm.
$\therefore \pi R^2 \times 7 = \frac{4}{3}\pi \times 21 \times 21 \times 21$
$\Rightarrow R^2 = \frac{4}{3} \times \frac{21 \times 21 \times 21}{7}$
$\therefore R = \sqrt{4 \times 21 \times 21} = 2 \times 21$
= 42 cm.
Surface area of sphere = $4\pi r^2$
= $4\pi (21)^2$ sq. cm.
Total surface area of the rod
= $2\pi R (R + H)$
= $2\pi \times 42\ (42 + 7)$
= $2\pi \times 42 \times 49$ sq. cm.
$\therefore$ Required ratio
= $\frac{2\pi \times 42 \times 49}{4\pi \times 21 \times 21} = 7 : 3$

TYPE-VI

1. (1) Let Circumference of base
= $\pi\ d$
$\Rightarrow \pi d = 6\ \pi \Rightarrow d = 6$ cm
$\therefore$ Height, $h = 6$ cm
Volume of the cylinder,
$V = \frac{\pi d^2 h}{4}$
$= \frac{\pi d^3}{4} = \frac{\pi (6)^3}{4}$ cc $= 54\pi$ cc

2. (1) Required number of tins
= $\frac{\text{Volume of cylindrical drum}}{\text{volume of a tin}}$
= $\frac{22 \times 350 \times 350 \times 240}{7 \times 2 \times 2 \times 25 \times 22 \times 35} = 1200$

3. (2) Volume of raised water in cylindrical beaker

$= \pi r^2 h = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 5.6$

= 215.6 cu.cm.

Volume of a marble $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times (0.7)^3 = \frac{4.312}{3}$ cu.cm.

$\therefore$ Number of marbles

$= \frac{215.6}{\frac{4.312}{3}} = \frac{215.6 \times 3}{4.312} = 150$

4. (3) Volume of cylindrical vessel $= \pi r^2 h$

Volume of cone $= \frac{1}{3}\pi r^2 h$

$\therefore$ Number of cones $= \frac{\pi r^2 h}{\frac{1}{3}\pi r^2 h} = 3$

5. (3) No. of Cubes

$= \frac{\text{Volume of larger cube}}{\text{Volume of smaller cube}}$

$= \frac{(15)^3}{(3)^3} = \frac{15 \times 15 \times 15}{3 \times 3 \times 3}$

= 5 × 5 × 5 = 125

6. (3) The number of cubes will be least if each cube will be of maximum edge.

$\therefore$ Maximum possible length = HCF of 6, 9, 12 = 3

$\therefore$ Volume of cube

= 3 × 3 × 3 cm^3

$\therefore$ Number of cubes

$= \frac{6 \times 9 \times 12 \text{ cm}^3}{3 \times 3 \times 3 \text{cm}^3} = 24$

7. (4) Volume of the box

= (56 × 35 × 28) cm^3

Volume of a soap cake

= (8 × 5 × 4) cm^3

$\therefore$ Number of soap cakes

$= \frac{56 \times 35 \times 28}{8 \times 5 \times 4} = 343$

8. (1) Let the cost of carpeting per sq. metre be ₹ 1.

$\therefore$ Area of the room

= 120 sq. metre

Let the breadth of the room be x metres.

Then, Length of room

$= \frac{120}{x}$ metres

New cost = 120 – 20 = ₹ 100

Breadth = $(x - 4)$ metres

Then, $\frac{120}{x} \times (x - 4) = 100$

$\Rightarrow \frac{6}{x}(x-4) = 5$

$\Rightarrow 6x - 24 = 5x$

$\Rightarrow x = 24$

$\therefore$ Breadth of the room

= 24 metres

9. (3) Area of the verandah

= (25 + 2 × 3.5) (15 + 2 × 3.5) – 25 × 15

= 32 × 22 – 25 × 15 = 704 – 375

= 329 sq.metre

$\therefore$ Cost of flooring = 329 × 27.5

= ₹ 9047.5

10. (2) Volume of bigger cube = 6 × 6 × 6

= 216 cu. cm.

Volume of unit cube

= 1 × 1 × 1 = 1 cu. cm

Number of uncoloured cubes

= 4 × 4 × 4 = 64 [because edge of uncoloured cube = 4 cm]

11. (4) Area of the curved surface = πrl

$l = \sqrt{r^2 + h^2} = \sqrt{(32)^2 + (60)^2}$

$= \sqrt{4624}$ = 68 cm

Area of the curved surface

$= \pi rl = \frac{22}{7} \times 32 \times 68$

$\therefore$ Total cost of painting

$= 35 \times \frac{22}{7} \times 32 \times 68 \times \frac{1}{10000}$

= ₹ 23.94 approx.

12. (2) Volume of a right circular cone

$= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times (3)^2 \times 4$

$= 12\pi$ cm^3

Volume of a solid sphere

$= \frac{4}{3}\pi \times (6)^3 = 288\ \pi\ cm^3$

Let the number of cones be n.

$\therefore n \times 12\pi = 288\ \pi$

$\Rightarrow n = \frac{288\pi}{12\pi} = 24$

13. (4) Using Rule 7,

Distance covered by the wheel in one revolution $= \pi d$

$= \frac{22}{7} \times 7 = 22$ metre

$\therefore$ Number of revolutions

$= \frac{22 \times 1000}{22} = 1000$

14. (1) Volume of bigger ball $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \pi \times 10 \times 10 \times 10$ cu. cm.

Volume of smaller ball

$= \frac{4}{3}\pi(0.5)^3$

$\therefore$ Possible number of smaller balls

$= \frac{\frac{4}{3}\pi \times 10 \times 10 \times 10}{\frac{4}{3}\pi \times 0.5 \times 0.5 \times 0.5} = 8000$

15. (1) Volume of rectangular block

= 11 × 10 × 5 = 550 cubic metre

= 550000 cubic dm

Volume of a sphere

$= \frac{4}{3}\pi \times \frac{5}{2} \times \frac{5}{2} \times \frac{5}{2}$ cubic dm.

$\approx \frac{500}{8}$ cubic dm

$\therefore$ Required answer

$= \frac{550000 \times 8}{500} = 8800$

16. (4) Let number of balls = n

$\therefore$ Volume of n balls = Volume of cone

$\Rightarrow n \times \frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^2 h$

$\Rightarrow n \times \frac{4}{3}(2)^3 = \frac{1}{3} \times (20)^2 \times 10$

$\Rightarrow n = 125$

17. (4) Let the radius of the base of cylinder be r units.

Height = 8r units

Its volume $= \pi r^2 \times 8r$

$= 8\pi r^3$ cu.units

Radius of sphere $= \frac{r}{2}$ units

Volume $= \frac{4}{3}\pi\left(\frac{r}{2}\right)^3$

$= \frac{\pi r^3}{6}$ cu.units

$\therefore$ Number of spherical balls

$= \frac{8\pi r^3}{\pi r^3} \times 6 = 48$

18. (1) Volume of the solid cube
= (44 × 44 × 44) cu.cm.

Volume of a bullet $= \frac{4}{3}\pi r^3$

$= \left(\frac{4}{3} \times \frac{22}{7} \times 2 \times 2 \times 2\right)$ cu.cm.

$\therefore$ Number of bullets

$= \frac{44 \times 44 \times 44 \times 3 \times 7}{4 \times 22 \times 2 \times 2 \times 2} = 2541$

19. (4) Volume of cylinder
$= \pi r^2 h = \pi \times 9 \times 5$
$= 45\pi$ cu.cm.

Volume of a cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times \frac{1}{100} \times 1$

$= \frac{\pi}{300}$ cu.cm.

$\therefore$ Number of cones $= \frac{45\pi}{\frac{\pi}{300}}$

= 13500

20. (1) Volume of metallic cone

$= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi \times 30 \times 30 \times 45$ cu.cm.

Volume of a sphere $= \frac{4}{3}\pi R^3$

$= \frac{4}{3}\pi \times 5 \times 5 \times 5$ cu. cm.

$\therefore$ Required number of spheres

$= \frac{\frac{1}{3}\pi \times 30 \times 30 \times 45}{\frac{4}{3}\pi \times 5 \times 5 \times 5} = 81$

21. (1) Volume of water flowing from the pipe in 1 minute
$= \pi \times 0.25 \times 0.25 \times 1000$ cu.cm.
Volume of conical vessel

$= \frac{1}{3}\pi \times 15 \times 15 \times 24$ cu.cm.

$\therefore$ Required time

$= \frac{\pi \times 15 \times 15 \times 24}{3\pi \times 0.25 \times 0.25 \times 1000}$

= 28 minutes 48 seconds

22. (4) Volume of sphere

$= \frac{4}{3}\pi (10.5)^3$ cu.cm.

Volume of a cone

$= \frac{1}{3}\pi (3.5)^2 \times 3$ cu.cm.

$\therefore$ Number of cones

$= \frac{\frac{4}{3}\pi (10.5)^3}{\frac{1}{3}\pi (3.5)^2 \times 3} = 126$

23. (4) Slant height of the tent (l)

$= \sqrt{12^2 + 9^2}$

$= \sqrt{144 + 81} = \sqrt{225}$

= 15 metre

$\therefore$ Curved surface area of the tent $= \pi rl$

= (3.14 × 12 × 15) sq. metre

$\therefore$ Total cost

= ₹ (3.14 × 12 × 15 ×120)

= ₹ 67824

24. (4) Using Rule 10,
Single equivalent decrease for 50% and 50%

$= \left(-50 - 50 + \frac{50 \times 50}{100}\right)\%$

= (– 100 + 25)% = – 75%

Single equivalent percent for – 75% and 50%

$= \left(-75 + 50 - \frac{75 \times 50}{100}\right)\%$

= (– 25 – 37.5)% = – 62.5%

Negative sign shows decrease.

25. (1) Using Rule 10,
Percentage increase

$= \left(x + y + \frac{xy}{100}\right)\%$

$\Rightarrow 0 = \left(10 + y + \frac{10y}{100}\right)$

$\Rightarrow -10 = y + \frac{y}{10}$

$\Rightarrow -10 = \frac{10y + y}{10}$

$\Rightarrow 11y = -100$

$\Rightarrow y = \frac{-100}{11} = -9\frac{1}{11}\%$

Negative sign shows decrease.

OR

Percentage decrease

$= \frac{10}{100 + 10} \times 100$

$= \frac{100}{11} = 9\frac{1}{11}\%$

26. (4) Using Rule 10,
Increase in height = 0%

Volume $= \frac{1}{3}$ area of base × height

$\therefore$ Percentage increase

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(100 + 0 + \frac{100 \times 0}{100}\right)\%$

= 100%

27. (4) Using Rule 10,
Required percentage increase

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(100 + 100 + \frac{100 \times 100}{100}\right)\%$

= 300%

28. (4) Edge of the original cube = x units

Edge of the new cube $= \frac{3x}{4}$ units

$\therefore$ Required ratio $= \frac{x^3}{\left(\frac{3x}{4}\right)^3}$

$= \frac{4^3}{3^3} = \frac{64}{27}$

29. (2) Percentage decrease

$= \frac{10}{100 + 10} \times 100$

$= \frac{100}{11} = 9\frac{1}{11}\%$

30. (4) Effective percentage change

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(-25 + 25 - \frac{25 \times 25}{100}\right)\%$

= –6.25%

Negative sign shows decrease.

31. (4) Radius of the base of cylindrical pillar = r metre (let)

$\therefore\ 2\pi r = 8.8$

$\Rightarrow 2 \times \frac{22}{7} \times r = 8.8$

$\Rightarrow r = \frac{8.8 \times 7}{2 \times 22} = 1.4$ metre.

Again,

$2\pi rh = 17.6$

$\Rightarrow 8.8 \times h = 17.6$

$\Rightarrow h = \frac{17.6}{8.8} = 2$ metre

$\therefore$ Volume of concrete $= \pi r^2 h$

$= \left(\frac{22}{7} \times 1.4 \times 1.4 \times 2\right)$ cu. metre

= 12.32 cu. metre

32. (2) Total number of cubes

= 160 + 56 = 216

Edge of cube $= \sqrt[3]{216} = 6$ units

Number of cubes without exposure

$= (6-2)^3 = 64$

These cubes will be inside the big cube.

Remaining cubes = 160 – 64 = 96

Again number of cubes with one face outside

= 6 × (4 × 4) = 96

$\therefore$ Required percent

$= \frac{96}{216} \times 100$

= 44.44%

33. (3) Volume of cone $= \frac{1}{3}\pi r^2 h$

Single equivalent increase in radius

$= \left(20 + 20 + \frac{20 \times 20}{100}\right)\%$

= 44%

Single equivalent percentage effect for 44% and 20%

$= \left(44 + 20 + \frac{44 \times 20}{100}\right)\%$

= (64 + 8.8)%

= 72.8% = Increase in volume

34. (3) Percentage increase in surface area of sphere

$= \left(20 + 20 + \frac{20 \times 20}{100}\right)\%$

= 44%

35. (4) Required percentage decrease $= \frac{4}{(100+4)} \times 100$

$= \frac{400}{104} = \frac{50}{13} = 3\frac{11}{13}\%$

36. (1) Volume of concial vessel

$= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi \times (5)^2 \times 8$

$= \frac{200\pi}{3}$ cu. cm. = Volume of water

Volume of 25% of water

$= \frac{1}{4} \times \frac{200\pi}{3} = \frac{50\pi}{3}$ cu. cm.

$\therefore$ Volume of ball $= \frac{4}{3}\pi R^3$

$= \frac{4}{3}\pi \times \left(\frac{1}{2}\right)^3$ cu. cm.

$= \frac{\pi}{6}$ cu. cm.

$\therefore$ Number of balls $= \frac{\frac{50\pi}{3}}{\frac{\pi}{6}}$

$= \frac{50\pi}{3} \times \frac{6}{\pi} = 100$

37. (4) Volume of cone

$= \frac{1}{3}\pi r^2 h$

$\therefore$ Resultant increase in radius^2

$= \left(20 + 20 + \frac{20 \times 20}{100}\right)\%$

= 44%

Resultant increase in r^2 and h

$= \left(44 + 20 + \frac{44 \times 20}{100}\right)\%$

= (64 + 8.8)% = 72.8%

TYPE-VII

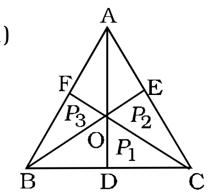
1. (3) $\theta = \frac{s}{r}$

$\Rightarrow s = r\theta$

$\Rightarrow s = r_1\theta_1 = r_2\theta_2$

$\Rightarrow \frac{r_1}{r_2} = \frac{\theta_2}{\theta_2} = \frac{75}{60} = \frac{5}{4}$ or 5 : 4

2. (1)



Let the side of ΔABC be x.

O is the point in the interior of ΔABC.

OD, OE, OF are perpendiculars.

$\therefore$ Clearly

$\Delta OAB + \Delta OBC + \Delta OAC = \Delta ABC$

$\Rightarrow \frac{1}{2}x \times p_3 + \frac{1}{2}x \times p_1 + \frac{1}{2}x \times p_2 = \frac{\sqrt{3}}{4}x^2$

$\Rightarrow \frac{1}{2}x(p_3 + p_1 + p_2) = \frac{\sqrt{3}}{4}x^2$

$\Rightarrow p_1 + p_2 + p_3 = \frac{\sqrt{3}}{2}x$

$\Rightarrow x = \frac{2}{\sqrt{3}}(p_1 + p_2 + p_3)$

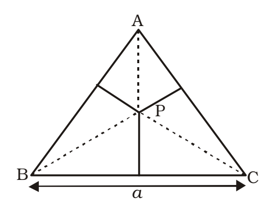
3. (2) Let the sides of triangle be $3x$, $4x$ and $5x$. Here,

$(3x)^2 + (4x)^2 = (5x)^2$

$\therefore$ The triangle is right angled.

Hence, the largest angle = 90°

4. (3) Let ABC be equilateral triangle of side a cm and P be a point inside it.



From the figure,

Area of Δ APB + Area of Δ PBC + Area of Δ APC = Area of Δ ABC

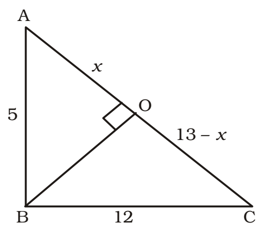
$\Rightarrow \frac{1}{2} \times a \times 6 + \frac{1}{2} \times a \times 7 + \frac{1}{2} \times a \times 8 = \frac{\sqrt{3}}{4}a^2$

$\Rightarrow \frac{1}{2}a(6+7+8) = \frac{\sqrt{3}}{4}a^2$

$\Rightarrow \frac{21a}{2} = \frac{\sqrt{3}}{4}a^2$

$\Rightarrow a = \frac{21}{2} \times \frac{4}{\sqrt{3}} = 14\sqrt{3}$ cm.

5. (2)



In ΔABC,

$AC = \sqrt{12^2 + 5^2} = \sqrt{144+25}$

$= \sqrt{169} = 13$

Let AO = x. Then

OC = $13 - x$

$OB^2 = 5^2 - x^2 = 25 - x^2$ ....(i)

$OB^2 = 12^2 - (13 - x)^2$

$= 144 - 169 - x^2 + 26x$ ....(ii)

From (i) and (ii),

$25 - x^2 = -25 - x^2 + 26x$

$\Rightarrow 26x = 50$

$\Rightarrow x = \frac{50}{26} = \frac{25}{13}$

$\therefore OB^2 = 25 - x^2$

$= 25 - \left(\frac{25}{13}\right)^2$

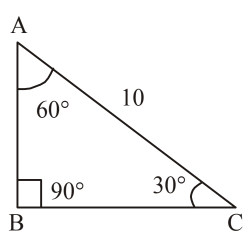
$\therefore OB^2 = 25 - x^2 = 25 - \left(\frac{25}{13}\right)^2$

$OB^2 = 25\left(1 - \frac{25}{169}\right) = 25 \times \frac{144}{169}$

$OB = \sqrt{\frac{25 \times 144}{169}} = \frac{5 \times 12}{13} = \frac{60}{13}$

$= 4\frac{8}{13}$ cm

6. (1)



From Δ ABC

$\sin 30° = \frac{AB}{AC}$

$\Rightarrow \frac{1}{2} = \frac{AB}{AC}$

$\Rightarrow AB = \frac{1}{2}AC = \frac{1}{2} \times 10 = 5$ cm

$\therefore BC = \sqrt{AC^2 - AB^2} = \sqrt{10^2 - 5^2}$

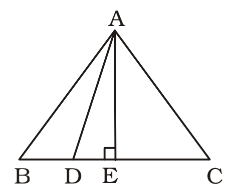
$= \sqrt{100 - 25} = \sqrt{75} = 5\sqrt{3}$ cm

$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times AB \times BC$

$= \frac{1}{2} \times 5 \times 5\sqrt{3} = \frac{25\sqrt{3}}{2}$ cm²

7. (3)



$AE \perp BC$

$\therefore$ BE = EC = 5 cm

AC = 10 cm

$AE = \sqrt{10^2 - 5^2}$

$= \sqrt{100-25} = \sqrt{75} = 5\sqrt{3}$ cm

DE = DC – EC

$= \frac{2}{3} \times 10 - 5 = \frac{5}{3}$ cm

$\therefore AD = \sqrt{\left(\frac{5}{3}\right)^2 + \left(5\sqrt{3}\right)^2}$

$= \sqrt{\frac{25}{9} + 75} = \sqrt{\frac{25+675}{9}}$

$= \sqrt{\frac{700}{9}} = \frac{10\sqrt{7}}{3}$ cm

8. (3) Smallest side of the triangle = x cm (let)

$\therefore$ Second side of triangle

$= 40 - 17 - x = 23 - x$

Semi-perimeter $= s = \frac{40}{2} = 20$

$\therefore \sqrt{s(s-a)(s-b)(s-c)} = 60$

$\Rightarrow \sqrt{20(20-17)(20-x)(20-23+x)}$

$= 60$

$\Rightarrow (20 - x)(x - 3) = 60$

$\Rightarrow 20x - 60 - x^2 + 3x = 60$

$\Rightarrow x^2 - 23x + 120 = 0$

$\Rightarrow x^2 - 15x - 8x + 120 = 0$

$\Rightarrow x(x - 15) - 8(x - 15) = 0$

$\Rightarrow (x - 8)(x - 15) = 0$

$\Rightarrow x = 8$ or 15

$\Rightarrow$ Smallest side = 8 cm

9. (3) Both the triangles are equi-angular.

$\Rightarrow$ These are similar triangles.

$\therefore$ Ratio of their height

= Square root of ratio of their area = 1 : 2

10. (1) We know that if all the sides of a parallelogram are equal, it is called a rhombus.

Area = Base × Height

= 6.5 × 10 = 65 cm²

Let the diagonals of the rhombus be d_1 and d_2.

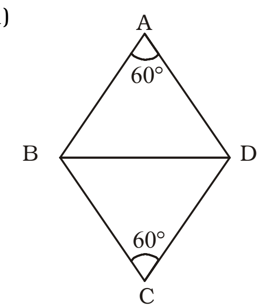
$\therefore$ Area $= \frac{1}{2} d_1 d_2$

$\Rightarrow 65 = \frac{1}{2} \times 26 \times d_2$

$\Rightarrow d_2 = \frac{2 \times 65}{26} \Rightarrow d_2 = 5$

Hence, other diagonal of rhombus = 5 cm.

11. (1)



Let AB = BC = CD = DA = 10 cm

$\angle BAD = \angle BCD = 60°$

$\therefore \angle ABC = \angle ADC = 120°$

and $\angle CBD = \angle CDB = 60°$

$\therefore$ BD = 10cm

12. (2) Area of the parallelogram

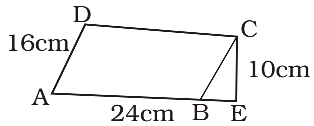
= Base × Height

= 15 × 12 = 180 sq.cm.

$\therefore$ 180 = 18 × height

$\Rightarrow$ Height = 10 cm

13. (3)



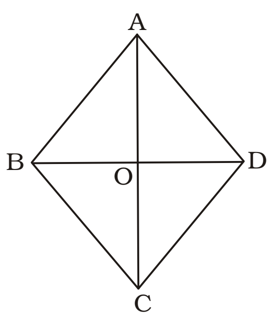
Area of the parallelogram
= Base × Height
= 24 × 10 = 240 sq.cm.
If the required distance be x cm, then
240 = 16 × x

$\Rightarrow x = \frac{240}{16} = 15$ cm

14. (4) Area of parallelogram
= base × height
= 27 × 12 = 324 sq. cm.
Again,
324 = 36 × h

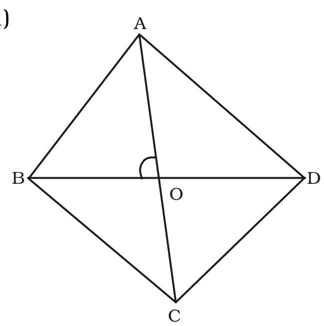
$\Rightarrow h = \frac{324}{36} = 9$ cm

15. (1) BO = 4 units; OC = 3 units
∠BOC = 90°



$\therefore$ BC = $\sqrt{4^2 + 3^2}$ = 5 units
$\therefore$ BC^2 = 25 sq. units

16. (1)



∠BAD = 60°
$\therefore$ ∠BAO = 30°
∠ABO = 60°

$\therefore \sin 60° = \frac{OA}{AB}$

$\Rightarrow \frac{\sqrt{3}}{2} \times 8 = OA$

$\Rightarrow$ OA = $4\sqrt{3}$

$\therefore$ AC = $8\sqrt{3}$ cm

17. (3) Side of rhombus

$= \sqrt{\left(\frac{d_1}{2}\right)^2 + \left(\sqrt{\frac{d_2}{2}}\right)^2}$

$= \sqrt{6^2 + 8^2} = 10$ cm

18. (3) Let the number of sides of the regular polygon be n, then

$\therefore \left(\frac{2n-4}{n}\right) \times 90$

$= 8 \times \frac{4 \times 90°}{n} + 18$

$\Rightarrow \left(\frac{2n-4}{n}\right) \times 5 = \frac{160}{n} + 1$

$\Rightarrow 10 = n - 20 = 160 + n$
$\Rightarrow 10n - n = 180$
$\Rightarrow 9n = 180$
$\Rightarrow n = 20$

19. (4) Number of sides of polygon

$= \frac{360}{72} = 5$

$\therefore$ Sum of interior angles
= $(2n - 4) \times 90°$
= $(2 \times 5 - 4) \times 90° = 540°$

20. (4) Volume of water drawn from cylinder

$= \pi r^2 h = \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} \times h$

$\therefore \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} \times h = 11000\text{cm}^3$

$\therefore h = \frac{11000 \times 7 \times 2 \times 2}{22 \times 35 \times 35}$

$= \frac{80}{7} = 11\frac{3}{7}$ cm.

21. (2) When a right circular cylinder is formed by rolling a rectangular paper along its length, the circumference of base is equal to length of paper.

$\therefore 2\pi r = 12 \Rightarrow r = \frac{12}{2\pi} = \frac{6}{\pi}$ cm

22. (2) Slant height of cone (l)

$= \sqrt{r^2 + h^2}$

$= \sqrt{2^2 + (2\sqrt{3})^2}$

$= \sqrt{4 + 12} = \sqrt{16} = 4$ cm

23. (3) Radius of sector = Slant height of cone

$= \sqrt{h^2 + r^2}$

$= \sqrt{6^2 + 8^2} = \sqrt{36 + 64}$

$= \sqrt{100} = 10$ cm

24. (3) Volume of cone

$= \frac{1}{3}\pi r^2 h$

$= \frac{\pi}{3} \times 1.6 \times 1.6 \times 3.6$

= π × 1.6 × 1.6 × 1.2 cu.cm.

$\therefore \frac{1}{3} \times \pi \times 1.2 \times 1.2 \times H$

(H is height of new cone)
= π × 1.6 × 1.6 × 1.2

$\Rightarrow H = \frac{1.6 \times 1.6 \times 3}{1.2} = 6.4$ cm

25. (4) Volume of copper sphere

$= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 3 \times 3 \times 3$

$= \frac{36 \times 22}{7}$ cm^3

Radius of the wire = 0.1 cm
The wire can be treated as a solid cylinder.
Let its length be h cm.

$\therefore \pi \times (0.1)^2 \times h = \frac{36 \times 22}{7}$

$\Rightarrow h = 36 \times \frac{22}{7} \times \frac{7}{22} \times \frac{1}{0.01}$

= 3600 cm = 36 m.
$\therefore$ Length of the wire
= 36 metres.

26. (1) $S = 4\pi r^2$, $V = \frac{4}{3}\pi r^3$

$\therefore \frac{S^3}{V^2} = \frac{64\pi^3 r^6}{\frac{16}{9}\pi^2 r^6}$

$= \frac{64\pi \times 9}{16} = 36\pi$

27. (4) Let Height of glass = h cm

then Radius = $\frac{h}{2}$ cm

Volume of glass = volume of 32000 drops

$\therefore \frac{1}{3}\pi\left(\frac{h}{2}\right)^2 \times h$

$= \frac{4}{3}\pi\left(\frac{1}{20}\right)^3 \times 32000$

$\Rightarrow \frac{h^3}{4} = 4 \times \frac{1}{8000} \times 32000$

$\Rightarrow h^3 = 4^3 \Rightarrow h = 4$ cm

28. (3) Walls are 5 cm thick.

$\therefore$ Internal length

= (330 – 2 × 5) cm = 320 cm.

Let the thickness of bottom be x

Breadth = (260 – 10)cm = 250 cm

Height = (110 – x) cm

Here, the cistern is assumed to be open and x is the thickness of bottom.

$\therefore$ 320 × 250 × (110 – x)

= 8000 litres

$\Rightarrow$ 320 × 250 × (110 – x)

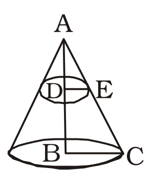
= 8000 × 1000 cm^3

$\Rightarrow (110 - x) = \frac{8000000}{320 \times 250}$

$\Rightarrow 110 - x = 100$

$\Rightarrow x = 10$ cm or 1 dm.

29. (4)



Δ ADE ~ Δ ABC

$\therefore \frac{AD}{AB} = \frac{DE}{BC} = \frac{1}{2}$

AD = AB ; DE = $\frac{1}{2}$ BC

$\therefore$Required ratio

$$= \frac{\frac{1}{3}\pi (DE)^2 \times AD}{\frac{1}{3}\pi BC^2 \times AB - \frac{1}{3}\pi (DE)^2 \times AD}$$

$$= \frac{DE^2 \times AD}{BC^2 \times AB - DE^2 \times AD}$$

$$= \frac{\frac{1}{4}BC^2 \times \frac{1}{2}AB}{BC^2 \times AB - \frac{1}{4}BC^2 \times \frac{AB}{2}}$$

$$= \frac{\frac{1}{8}}{1 - \frac{1}{8}} = 1 : 7$$

30. (4) We know that

Circumference = $2\pi r$

$= 2 \times \frac{22}{7} \times 5 = \frac{220}{7}$

Area = πr^2 $= \frac{22}{7} \times 25 = \frac{550}{7}$

$\Rightarrow$ Required %

$= \frac{550}{7} \times \frac{7}{220} \times 100 = 250\%$

31. (4) We know that

The area of circle = πr^2

$= \frac{\pi D^2}{4}$

[where D : diameter of circle]

and Circumference of circle

= $2\pi r$ = πD

Now, according to question,

$\frac{\pi D^2}{4} = \pi D$

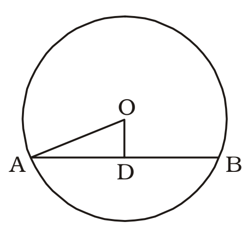
$D^2 = 4D$

$D^2 - 4D = 0$

$\Rightarrow D(D - 4) = 0$

$\Rightarrow D = 4$

32. (1)



AD = DB = 15 cm[$\because$ AB = 30 cm]

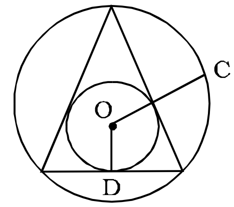
OD = 8 cm

OA = $\sqrt{15^2 + 8^2}$

= $\sqrt{225 + 64} = \sqrt{289}$

= 17cm

33. (3)

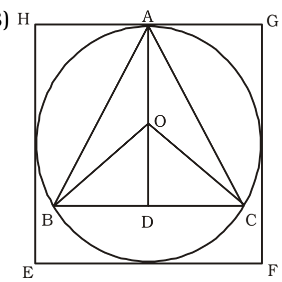


$\because \frac{OC}{OD} = \frac{2}{1}$

$\Rightarrow \frac{8}{OD} = \frac{2}{1} \Rightarrow OD = 4$ cm

In-radius = 4 cm

34. (3)



Area of equilateral triangle ABC

$= \frac{\sqrt{3}}{4} \times \left(4\sqrt{3}\right)^2 = \frac{48\sqrt{3}}{4}$

$= 12\sqrt{3}$ cm^2

Again, AD is the height and O is the centre of the circle

$\therefore$ Area of Δ ABC

$= \frac{1}{2} \times BC \times AD$

$\Rightarrow 12\sqrt{3} = \frac{1}{2} \times 4\sqrt{3} \times AD$

$\Rightarrow AD = \frac{12\sqrt{3}}{2\sqrt{3}} = 6$

$\therefore OD = \frac{1}{3}AD = 2$ cm

$\therefore OB = \sqrt{BD^2 + OD^2}$

$= \sqrt{\left(2\sqrt{3}\right)^2 + 2^2} = \sqrt{16} = 4$ cm.

$\therefore$ Side of square = 2 × OB

= 2 × 4 = 8 cm.

$\therefore$ Diagonal of square

= $\sqrt{2}$ × Side = $8\sqrt{2}$ cm

35. (2) Radius of the circumcircle

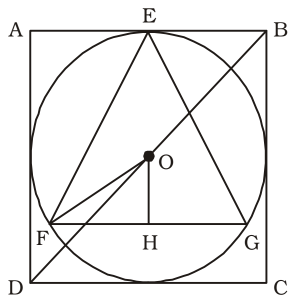
$= \frac{2}{3} \times 4\sqrt{3}$ cm $= 2r$ cm

Radius of the in circle

$= \frac{1}{3} \times 4\sqrt{3}$ cm = r cm

$\therefore$ Required ratio = $\pi (2r)^2 : \pi r^2$
= 4 : 1

36. (3)



Side of square

$= \frac{1}{\sqrt{2}} \times 12\sqrt{2}$ = 12 cm

$\therefore$ Radius of circle

$= \frac{12}{2}$ = 6 cm

AB = $2x$ cm
$\therefore$ FH = x cm
$\therefore$ From ΔOFH,

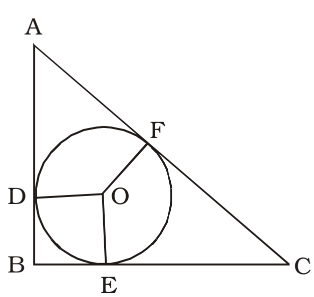
$\cos 30^\circ = \frac{FH}{OF}$

$\Rightarrow \frac{\sqrt{3}}{2} = \frac{x}{6}$

$\Rightarrow x = \frac{6 \times \sqrt{3}}{2} = 3\sqrt{3}$

$\therefore$ Length of side = $6\sqrt{3}$ cm

37. (3) $9^2 + 12^2 = 15^2$
$\therefore$ The triangle is right angled

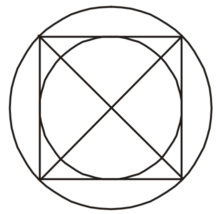


AB = 9, BC = 12 cm
OD = OE = OF = x cm
AD = AF = 9 – x
EC = CF = 12 – x

$\therefore$ AC = AF + FC
$= 9 - x + 12 - x = 15$
$\Rightarrow 21 - 2x = 15$
$\Rightarrow 2x = 21 - 15 = 6$

$\Rightarrow x = \frac{6}{2} = 3$ cm

38. (1)



Radius of circum-circle

$= \frac{\text{Diagonal}}{2} = \frac{\sqrt{2} \times \text{Side}}{2} = \frac{\text{Side}}{\sqrt{2}}$

Radius of in-circle = $\frac{\text{Side}}{2}$

$\therefore$ Ratio = $\frac{\text{Side}}{2} : \frac{\text{Side}}{\sqrt{2}}$ =

$1 : \sqrt{2}$

39. (4) Let the length and breadth of rectangle be x and y m. respectively.
According to the question,
$2(x + y) = 160$

$\Rightarrow x + y = \frac{160}{2} = 80$ m
...(i)
Perimeter of square = 160 m

$\therefore$ Side of square = $\frac{160}{4}$ = 40 m

Now,
Area of rectangle = xy
Area of square = 40 × 40
= 1600 m^2
Then,
$1600 - xy = 100$
$\Rightarrow xy = 1600 - 100 = 1500$ ..(ii)
Now,
$(x - y)^2 = (x + y)^2 - 4xy$
$= (80)^2 - 4 \times 1500$
$= 6400 - 6000 = 400$

$\Rightarrow x - y = \sqrt{400} = 20$
...(iii)
From equations (i) and (iii),
$2x = 100$

$\Rightarrow x = \frac{100}{2} = 50$ m.

40. (4) Volume of the cylinder= $\pi r^2 h$

$= \frac{\pi d^2 h}{4}$ cubic units

$\left[\because r = \frac{d}{2}\right]$

Volume of sphere = $\frac{4}{3}\pi\left(\frac{d}{2}\right)^3$

$= \frac{\pi}{6}d^3$ cubic units
According to the question,

$\frac{\pi}{6}d^3 = \frac{\pi d^2 h}{4}$

$\Rightarrow \frac{d}{6} = \frac{h}{4} \Rightarrow 4d = 6h$

$\Rightarrow 2d = 3h$

41. (4) Volume of sphere = $\frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 9 \times 9 \times 9$

= 972π cu.cm.

Volume of cone = $\frac{1}{3}\pi R^2 H$

$= \frac{1}{3}\pi \times 9 \times 9 \times 9$

= 243π cu.cm.
$\therefore$ Percentage of wood wasted

$= \frac{(972\pi - 243\pi)}{972\pi} \times 100$

= 75%

Method 2 :

$\boxed{\text{Quicker Approach}}$

In both cases
$\because$ r = 9, h = 9cm

$\therefore$ Volume of sphere = $\frac{4}{3}\pi r^3$

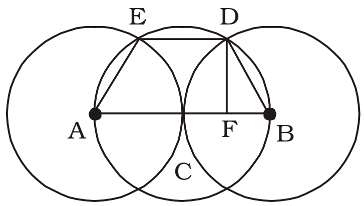
and Volume of cone = $\frac{1}{3}\pi r^3$

Wasted wood = πr^3
$\therefore$ Required percentage

$= \frac{\pi r^3}{\frac{4}{3}\pi r^3} \times 100$

$= \frac{3}{4} \times 100 = 75\%$

42. (2)



ABDE will be a trapezium
AB = 4 units

DE $=\frac{1}{2}$ AB = 2 units

FB = 1 unit, BD = 2 units.

$\Rightarrow$ DF $=\sqrt{2^2-1^2}=\sqrt{3}$ units

$\therefore$ Area of ABDE

$=\frac{1}{2}(AB+DE)\times DF$

$=\frac{1}{2}(4+2)\times\sqrt{3}$

$=3\sqrt{3}$ sq. units

43. (2) Length of parallelopiped
= 12 cm.
breadth = 6 cm.
height = 6 cm.
$\therefore$ Total surface area
= 2 (12 × 6 + 6 × 6 + 12 × 6) sq.cm.
= 2 (72 + 36 + 72) sq.cm.
= 360 sq.cm.

44. (4) Volume of sphere $=\frac{4}{3}\pi r^3$

$=\frac{4}{3}\times\pi\times9\times9\times9$

$=972\pi$ cu. cm

Let the radius of wire be R cm, then

$\pi R^2\times10800=972\pi$

$\Rightarrow R^2=\frac{972}{10800}=0.09$

$\Rightarrow R=\sqrt{0.09}=0.3$ cm

$\therefore$ Diameter = 2 × 0.3 = 0.6 cm

45. (2) Volume of water flowed in an hour
= 2000 × 40 × 3 cubic metre
= 240000 cubic metre
$\therefore$ Volume of water flowed in 1 minute

$=\frac{240000}{60}=4000$ cubic metre

= 4000000 litre

46. (2) Water flowed in 1 hour through the pipe

$=\frac{22}{7}\times\frac{10\times10\times3000}{10000}\ m^3$

$=\frac{660}{7}\ m^3$

Volume of circular/cylindrical cistern

$=\frac{22}{7}\times5\times5\times2=\frac{1100}{7}\ m^3$

$\therefore$ Required time $=\frac{\frac{1100}{7}}{\frac{660}{7}}=\frac{5}{3}$ hours

or 1 hour $\frac{2}{3}\times60$ minutes

or 1 hour 40 minutes

47. (2) Let amount of rainfall be 'x'

$20\times20\times x=\frac{22}{7}\times1^2\times3.5$

$\Rightarrow x=\frac{22\times3.5}{7\times22\times20}$

= 0.025 metre = 2.5 cm

48. (2) Volume of rain water = Area of base × height

$=1000000\times\frac{2}{100}$

= 20000 cu. metre
Water stored in pool
= 10000 cu. metre
$\therefore$ Required water level

$=\frac{10000}{1000}=10$ metre

49. (4) Let the sides of the parallelopiped be $2x$, $4x$ and $8x$ units respectively and the edge of cube be y units.
$\therefore 2x\times4x\times8x=y^3$
$\Rightarrow 8\times8\ x^3=y^3$
Taking cube roots,
$\Rightarrow 4x=y$ .....(i)
Surface area of parallelopiped
= 2 ($2x\times4x+4x\times8x+8x\times2x$)
= 2 ($8x^2+32x^2+16x^2$)
= $112x^2$ sq. units.
Surface area of cube
= $6y^2$ sq. units.

$\therefore$ Required ratio

$=\frac{112x^2}{6y^2}=\frac{112x^2}{6\times16x^2}$

$=\frac{7}{6}$ or 7 : 6

50. (3) Let the third side of the rectangular parallelopiped be x cm, then
2 ($x\times1+1\times2+2\times x$) = 22
$\Rightarrow 3x+2=11$
$\Rightarrow 3x=11-2=9$

$\Rightarrow x=\frac{9}{3}=3$ cm

Diagonal $=\sqrt{l^2+b^2+h^2}$

$=\sqrt{3^2+2^2+1^2}$

$=\sqrt{9+4+1}$

$=\sqrt{14}$ cm

51. (2) Volume of earth taken out
$=\pi r^2h$

$=\frac{22}{7}\times2\times2\times56=704\ m^3$

Volume of the ditch
= 48×16.5×4 m^3 = 3168 m^3
Part of the ditch filled

$=\frac{704}{3168}=\frac{2}{9}$

52. (2) Radius of circle = x cm.
Side of square = y cm.
Side of equilateral triangle
= z cm.
Circumference of circle = Perimeter of square = Perimeter of equilateral triangle
$\Rightarrow 2\pi x=4y=3z$

$\Rightarrow x=\frac{4y}{2\pi}=\frac{2y}{\pi}$

$z=\frac{4y}{3}$

Area of circle 'C' = πx^2

$=\pi\times\frac{4}{\pi^2}y^2=\frac{4}{\pi}y^2>y^2$

Area of square 'S' = y^2

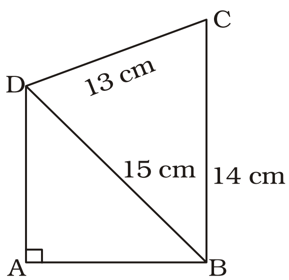
Area of triangle 'T' $=\frac{\sqrt{3}}{4}z^2$

$= \frac{\sqrt{3}}{4} \times \frac{4 \times 4}{3 \times 3} y^2$

$= \frac{4}{3\sqrt{3}} y^2 < y^2$

$\therefore$ T < S < C

53. (1) Area of base = Area of Δ ABD + Area of Δ BCD



In, Δ ABD

BD = $\sqrt{AB^2 + AD^2} = \sqrt{9^2 + 12^2}$

$= \sqrt{81 + 144} = \sqrt{225}$ = 15 cm

Area of Δ ABD

$= \frac{1}{2} \times AB \times AD$

$= \frac{1}{2} \times 9 \times 12$

= 54 sq. cm

For Δ BCD,

Semi-perimeter (s) = $\frac{13 + 14 + 15}{2}$

$= \frac{42}{2} = 21$

$\therefore$ Area of Δ BCD

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{21(21-13)(21-14)(21-15)}$

$= \sqrt{21 \times 8 \times 7 \times 6}$

= 21 × 4 = 84 sq. cm

Area of quadrilateral ABCD

= 54 + 84 = 138 sq, cm

$\therefore$ Height of prism

$= \frac{\text{Volume}}{\text{Area of base}} = \frac{2070}{138}$

= 15 cm

Perimeter of base

= (9 + 14 + 13 +12) cm

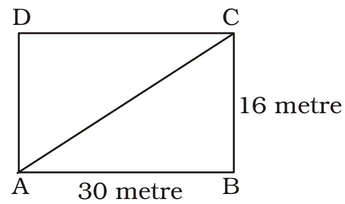
= 48 cm

$\therefore$ Area of lateral surfaces

= perimeter × height

= 48 × 15 = 720 sq. cm.

54. (2)



AC = $\sqrt{AB^2 + BC^2}$

$= \sqrt{30^2 + 16^2}$

$= \sqrt{900 + 256} = \sqrt{1156}$

= 34 metre

Distance travelled by elephant = 34 – 4 = 30 metre

$\therefore$ Speed of elephant = $\frac{30}{15}$

= 2 m/sec.

55. (4) Distance covered in one revolution = Circumference of circular field = $2\pi r$

Again, speed of horse

= 66 metre/second

Time = $\frac{5}{2}$ seconds

$\therefore$ Distance covered = 66 × $\frac{5}{2}$

= 165 metre

$\therefore 2\pi r = 165$

$\Rightarrow 2 \times \frac{22}{7} \times r = 165$

$\Rightarrow r = \frac{165 \times 7}{2 \times 22}$ = 26.25 metre

56. (3) Number of revolutions of rear wheel

= m (let)

Distance covered by front wheel in 1 revolution

= π × diameter

= $2\pi x$ cm.

Distance covered by rear wheel in 1 revolution = $2\pi y$ cm

$\therefore 2\pi x \times n = 2\pi y \times m$

$\Rightarrow m = \frac{nx}{y}$

57. (2) Distance covered by wheel in 1 revolution = π × diameter

$= \frac{22}{7} \times 56$ = 176 cm

Total distance = 2.2 km

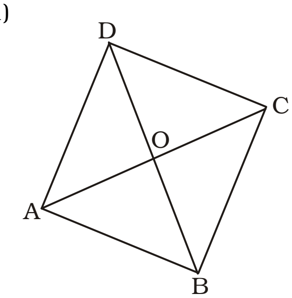
= (2.2 × 1000 ×100) cm

= 220000 cm

$\therefore$ Number of revolutions

$= \frac{220000}{176} = 1250$

58. (1)



AC = 10 cm.

AO = OC = 5 cm.

$\angle$ AOB = 90°

AB = 13 cm.

From Δ AOB,

$\therefore$ OB

$= \sqrt{AB^2 - OA^2} = \sqrt{13^2 - 5^2}$

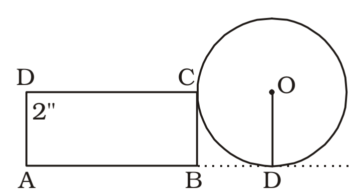
$= \sqrt{169 - 25} = \sqrt{144}$

= 12 cm.

$\therefore$ BD = 2OB = 2 × 12

= 24 cm.

59. (4)



BC = 2" ; $\angle$ODB = 90°

BD = 6" = Radius of wheel

60. (4) According to the Euler's formula,

V + F – E = 2

$\Rightarrow$ 12 + F – 30 = 2

$\Rightarrow$ F – 18 = 2

$\Rightarrow$ F = 18 + 2 = 20

❑❑❑

TEST YOURSELF

1. A sphere of radius r is inscribed in a right circular cone whose slant height equals twice the radius of the base a. What is the relation between r and a ?

(1) $r = \frac{a}{\sqrt{2}}$ (2) $r = \frac{a}{3}$

(3) $r = \frac{a}{\sqrt{3}}$ (4) $3r = 2a$

2. When the length of rectangle is decreased by 10ft. and the breadth is increased by 5 feet, the rectangle becomes a square and its area is reduced by 210 square feet. Find the area of the rectangle.

(1) 2440 square feet

(2) 2340 square feet

(3) 2444 square feet

(4) 2540 square feet

3. ABCD is a parallelogram. P and Q are the mid-points of BC and CD respectively. What is the ratio between the area of ΔAPQ to that of the parallelogram ABCD ?

(1) 3 : 7 (2) 3 : 8

(3) 3 : 5 (4) 4 : 9

4. A solid sphere of diameter 6 cms is melted and shaped as a hollow cylinder of outer radius 5 cms and height 4 cms. What is the thickness of the cylinder ?

(1) 2 cm (2) 2.5 cm

(3) 9 cm (4) 1 cm

5. The sum of length, breadth and height of a rectangular parallelopiped is 20 cm. and its whole surface area is 264 sq. cm. Find the area of the square whose side is equal to the length of the diagonal of the parallelopiped.

(1) 136 square cm.

(2) 120 square cm.

(3) 125 square cm.

(4) 100 square cm.

6. Find the ratio of the areas of squares circumscribed about and inscribed in the same circle.

(1) 1 : 3 (2) 2 : 1

(3) $\sqrt{2}$: 1 (4) 1 : $\sqrt{2}$

7. A cube and a sphere have equal surface areas. Find the ratio of their volumes.

(1) $\pi : \sqrt{6}$ (2) $\sqrt{\pi} : \sqrt{6}$

(3) $\sqrt{\pi} : 6$ (4) None of these

8. The outer and inner radii of a hollow metallic cylinder of height 24 cms. are respectively 6.75 cms. and 5.25 cms. It is melted to form a solid sphere. Find the surface area of the sphere.

(1) $\pi \times (12)^{\frac{2}{3}}$ sq. cm

(2) $\pi \times 36 \times (12)^{\frac{2}{3}}$ sq. cm

(3) 1220 sq. cm

(4) $\pi \times 36 \times (12)^{\frac{1}{3}}$ sq. cm

9. A right pyramid stands on a square base of diagonal $10\sqrt{2}$ cm. If the height of the pyramid is 12 cm, the area (in cm^2) of its slant surface is

(1) 520 (2) 420

(3) 360 (4) 260

10. If the altitude of a right prism is 10 cm and its base is an equilateral triangle of side 12 cm, then its total surface area (in cm^2) is

(1) $(5 + 3\sqrt{3})$ (2) $36\sqrt{3}$

(3) 360 (4) $72(5+\sqrt{3})$

11. In ΔABC, D, E and F are the mid-points of sides BC, CA and AB respectively. What is the area of quadrilateral BDEF ?

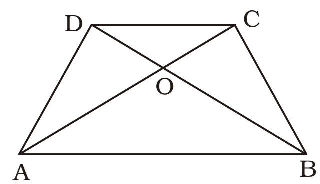
(1) $\frac{1}{3}$ rd of area of Δ ABC

(2) Half of the area of Δ ABC

(3) $\frac{1}{4}$ th of the area of Δ ABC

(4) None of these

12. ABCD is a trapezium in which AB||DC and AB = 2DC. Then what is the ratio between the areas of ΔAOB and ΔCOD respectively ?



(1) 4 : 1 (2) 1 : 3

(3) 2 : 1 (4) 3 : 1

13. The area of a triangle formed by $y = x$, $x = 6$ and $y = 0$ is :

(1) 36 sq. units (2) 18 sq. units

(3) 9 sq. units (4) 72 sq. units

14. The radius of a circle is so increased that its circumference increases by 5%. The area of the circle then increases by:

(1) 12.5% (2) 10.25%

(3) 10.5% (4) None of these

15. A lawn is in the form of a rectangle having its breadth and length respectively in the ratio 2 : 3. The area of the lawn is 600 sq. metres. Find the length of the lawn

(1) 20m (2) 30m

(3) 25m (4) None of these

16. The breadth of a rectangular plot is decreased by 20 per cent. By what percent should the length be increased to keep the area same?

(1) 25 (2) 20

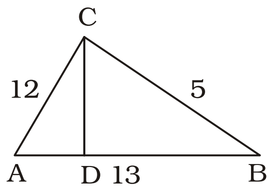
(3) 30 (4) None of these

17. A cow is grazing in a pasture bordered by two fences more than ten feet long that meet at an angle of 60°. If the cow is tethered by a ten foot rope to the post where the fences meet, it can graze an area of:

(1) 20π sq. feet (2) $\frac{50\pi}{3}$ sq. feet

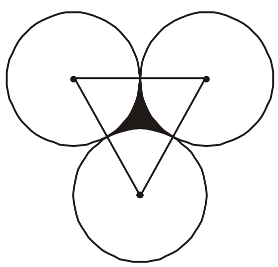
(3) $\frac{5\pi}{3}$ sq. feet (4) None of these

18. CD is a $\perp$ dropped from C. If the area of Δ ADC is 'a', then the area of Δ BDC is :



(1) $(30 - a)$ sq. units
(2) $(60 - a)$ sq. units
(3) $\left(a + \frac{12}{5}a\right)$ sq. units
(4) None of these

19. The radius of each circle is 'a'. Then the area of the shaded portion is :



(1) $a^2\left(\sqrt{3} - \frac{\pi}{2}\right)$ sq. units

(2) $a\left(\pi a^2 - \sqrt{3}\right)$ sq. units

(3) $\left(a^2 - \frac{\pi}{2}\right)\sqrt{3}$ sq. units

(4) None of these

20. If the radius of a circle is increased by 20% then how much will its area be increased by ?
(1) 40% (2) 44%
(3) 50% (4) None of these

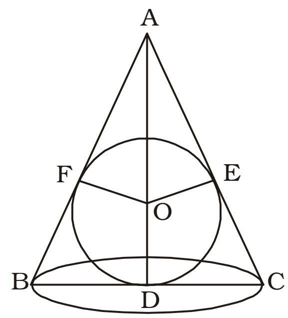
21. 66 cubic centimetres of silver is drawn into a wire 1 mm in diameter. The length of the wire in metres will be :
(1) 84 (2) 128
(3) 116 (4) None of these

SHORT ANSWERS

1. (3)	**2.** (3)	**3.** (2)	**4.** (4)
5. (1)	**6.** (2)	**7.** (2)	**8.** (2)
9. (4)	**10.** (4)	**11.** (2)	**12.** (1)
13. (2)	**14.** (2)	**15.** (2)	**16.** (1)
17. (2)	**18.** (1)	**19.** (1)	**20.** (2)
21. (1)			

EXPLANATIONS

1. (3)



AB = $2a$
BD = a
AD = $\sqrt{4a^2 - a^2}$
$= \sqrt{3a^2} = \sqrt{3}a$
$\angle AFO = 90°$
OD = r
AO = $\sqrt{3}a - r$

sin BAD = $\frac{a}{2a} = \frac{1}{2}$

$\angle BAD = 30°$
sin 30°

$= \frac{OF}{AO} \Rightarrow \frac{1}{2} = \frac{r}{AO} = \frac{r}{\sqrt{3}a - r}$

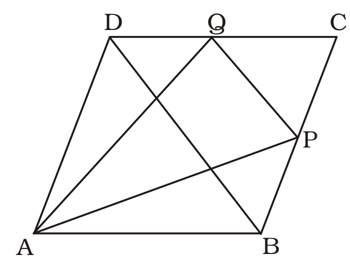
$\Rightarrow 2r = \sqrt{3}a - r$

$\Rightarrow 3r = \sqrt{3}a$

$\Rightarrow r = \frac{a}{\sqrt{3}}$

2. (3) Let the length and breadth of rectangle be x and y feet respectively.
Area of rectangle = xy
Again, $x - 10 = y + 5$ = side of square
$\Rightarrow x = y + 15$ ....(i)
Again, $xy - (y + 5)^2 = 210$
$\Rightarrow y(y + 15) - (y^2 + 10y + 25)$
$= 210$
$\Rightarrow y^2 + 15y - y^2 - 10y - 25$
$= 210$
$\Rightarrow 5y = 235$
$\Rightarrow y = 47$ feet
$\therefore x = y + 5 = 52$ feet
Area of rectangle = 52×47
= 2444 sq. feet

3. (2)



In Δ BCD,

PQ $\parallel$ BD and PQ = $\frac{1}{2}$ BD

$\Rightarrow ar(\Delta CPQ) = \frac{1}{4}\ ar(BDC)$

$\Rightarrow ar(\Delta CPQ)$

$= \frac{1}{8}\ ar(\|^{gm}\ ABCD)$

[$\because \frac{1}{2} ar\ (\|^{gm}\ ABCD = ar\ (\Delta BCD)$]

BP = $\frac{1}{2}$BC

$\therefore$ ar (Δ ABP) = $\frac{1}{4}$ ($\|^{gm}$ ABCD)

Similarly, ar (Δ AQD)

$= \frac{1}{4}$ ($\|^{gm}$ ABCD)

$\therefore ar$ (Δ APQ) = ar ($\|^{gm}$ ABCD
– [ar Δ ABP + ar (Δ AQD) + ar (Δ CPQ)]

= ar ($\|^{gm}$ ABCD) – $\left(\frac{1}{4} + \frac{1}{4} + \frac{1}{8}\right)$

ar ($\|^{gm}$ ABCD)

$= \left(1 - \frac{5}{8}\right) ar\,(\|^{gm} ABCD)$

$= \frac{3}{8}\, ar\,(\|^{gm} ABCD)$

4. (4) Volume of sphere = $\frac{4}{3}\pi r^3$ =

$\frac{4}{3}\pi \times (3)^3$ cu.cm.

Let the thickness of cylinder be x cm.

$\therefore$ Its internal radius

= $(5 - x)$ cm

Now, volume of cylinder

$= \frac{4}{3}\pi \times 27$

$\Rightarrow \pi\,\{(5)^2 - (5 - x)^2\} \times 4$

$= \frac{4}{3}\pi \times 27$

$\Rightarrow 25 - (25 + x^2 - 10x) = 9$

$\Rightarrow x^2 - 10x + 9 = 0$

$\Rightarrow x^2 - 9x - x + 9 = 0$

$\Rightarrow x\,(x - 9) - 1\,(x - 9) = 0$

$\Rightarrow (x - 1)\,(x - 9) = 0$

$\Rightarrow x = 1$ because $x \neq 9$

5. (1) Let the length, breadth and height of the parallelopiped be a, b and c cm respectively.

$\therefore\ a + b + c = 20$

$2\,(ab + bc + ca) = 264$

$\therefore\ (a + b + c)^2 = a^2 + b^2 + c^2 + 2\,(ab + bc + ca)$

$\Rightarrow 400 = a^2 + b^2 + c^2 + 264$

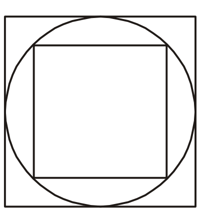
$\Rightarrow a^2 + b^2 + c^2 = 400 - 264$

= 136 sq. cm.

Area of square

$= \left(\sqrt{a^2 + b^2 + c^2}\right)^2 = 136$ sq. cm.

6. (2)



Let the diameter of circle be d units.

$\therefore$ Diagonal of the inscribed square = d

Its area = $\frac{1}{2}d^2$ sq. units.

Side of the circumscribed square = d units

$\therefore$ Its area = d^2 sq. units

Required ratio

$= d^2 : \frac{1}{2}d^2 = 2 : 1$

7. (2) Let the edge of cube be x units and radius of sphere be y units.

$\therefore$ Surface area of cube = surface area of sphere

$\Rightarrow 6x^2 = 4\pi y^2$

$\Rightarrow \frac{x^2}{y^2} = \frac{4\pi}{6} = \frac{2\pi}{3}$

$\Rightarrow \frac{x}{y} = \sqrt{\frac{2\pi}{3}} \Rightarrow x : y = \sqrt{2\pi} : \sqrt{3}$

$\Rightarrow$ Volume of cube : Volume of sphere

$= x^3 : \frac{4}{3}\pi y^3 = 3x^3 : 4\pi y^3$

$= 3 \times 2\pi\sqrt{2\pi} : 4\pi \times 3 \times \sqrt{3}$

$= \sqrt{2\pi} : 2\sqrt{3}$

$= \sqrt{\pi} : \sqrt{6}$

8. (2) Volume of metallic cylinder

$= \pi\left(r_2^2 - r_1^2\right) \times h$

$= \pi\,(6.75^2 - 5.25^2) \times 24$

$= \pi \times 12 \times 1.5 \times 24$ cu.cm.

$\therefore$ Volume of sphere

$= \pi \times 12 \times 1.5 \times 24$

$\Rightarrow \frac{4}{3}\pi r^3 = \pi \times 12 \times 1.5 \times 24$

$\Rightarrow r^3 = \frac{12 \times 1.5 \times 24 \times 3}{4}$

$= 12 \times 3 \times 3 \times 3$

$\therefore\ r = \sqrt[3]{12 \times 3 \times 3 \times 3}$

$= 3\sqrt[3]{12}$

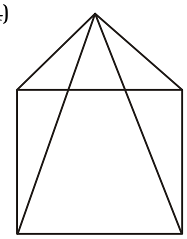
$\therefore$ Surface area = $4\pi r^2$

$= 4 \times \pi \times \left(3\sqrt[3]{12}\right)^2$

$= 4 \times \pi \times 9\ (12)^{\frac{2}{3}}$

$= \pi \times 36\ (12)^{\frac{2}{3}}$ sq.cm.

9. (4)



Side of square base

$= \frac{1}{\sqrt{2}} \times 10\sqrt{2} = 10$ cm

Slant height = $\sqrt{5^2 + 12^2}$

= 13 cm

$\therefore$ Area of the lateral surface

$= \frac{1}{2} \times$ perimeter of base $\times$ slant height

$= \frac{1}{2} \times 40 \times 13 = 260$ sq. cm.

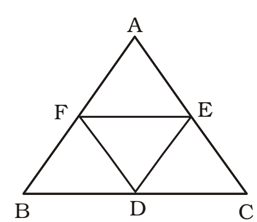
10. (4) Total surface area = Perimeter of base ×height + 2 × area of base

$= 36 \times 10 + 2 \times \frac{\sqrt{3}}{4} \times 12 \times 12$

$= 360 + 72\sqrt{3}$

$= 72\,(5 + \sqrt{3})$ sq. cm

11. (2)



D, E are the mid-points on BC and AC respectively.

$\therefore$ DE || BA $\Rightarrow$ DE || BF

Similarly, FE || BD

$\therefore$ BDEF is a parallelogram.

Similarly, DCEF and AFDE are parallelograms.

$\therefore$ Δ BDF = Δ DEF

Δ DCE = Δ DEF

and Δ AFE = Δ DEF

$\therefore$ ΔBDF = ΔDCE = ΔAFE = ΔDEF

$\Rightarrow$ ΔDEF = $\frac{1}{4}$ ΔABC

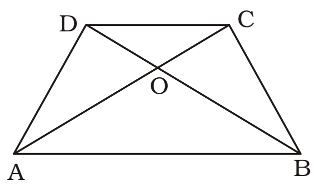
$\therefore$ Quadrilateral BDEF = 2 × ΔDEF

$\Rightarrow$ Quadrilateral BDEF

= 2 × $\frac{1}{4}$ ΔABC

= $\frac{1}{2}$ ΔABC

12. (1)



In Δ AOB and Δ COD,

$\angle$AOB = $\angle$COD and $\angle$OAB = $\angle$OCD

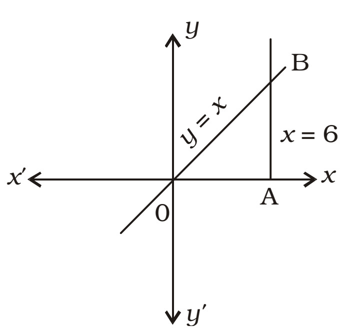
By AA-similarly theorem,

Δ AOB ~ Δ COD

$\therefore$ $\frac{\Delta AOB}{\Delta COD} = \frac{AB^2}{DC^2}$

$= \frac{(2DC)^2}{DC^2} = \frac{4}{1}$

13. (2)



Co-ordinates of point B = (6, 6)

as $y = x$ and $x = 6$

$\therefore$ OA = 6 and AB = 6

$\therefore$ Area of ΔOAB

$= \frac{1}{2} \times OA \times AB$

$= \frac{1}{2} \times 6 \times 6 = 18$ sq. units

14. (2) Increase in radius of circle = Increase in circumference of circle = 5%

$\therefore$ Increase in area

$= \left(5 + 5 + \frac{5 \times 5}{100}\right)\% = 10.25\%$

15. (2) $2x \times 3x = 600$

$\Rightarrow 6x^2 = 600 \Rightarrow x^2 = 100$

$\Rightarrow x = 10$

$\therefore$ Length = 3 × 10 = 30 metre

16. (1) $0 = x - 20 - \frac{20x}{100}$

$\left[\text{Net effect} = \left(x + y + \frac{xy}{100}\right)\%\right]$

$\Rightarrow x - 20 - \frac{x}{5} = 0$

$\Rightarrow 5x - 100 - x = 0$

$\Rightarrow 4x = 100 \Rightarrow x = 25\%$

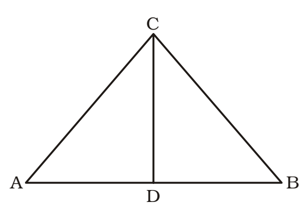
17. (2) Required region

$= \frac{60°}{360°} \times \pi r^2$

$= \frac{1}{6} \times \pi \times 10 \times 10$

$= \frac{50\pi}{3}$ sq.feet

18. (1)



$5^2 + 12^2 = 13^2$

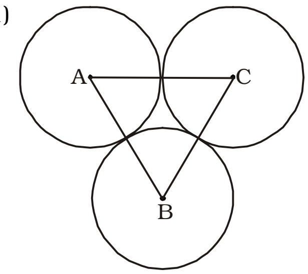
ΔABC is a right angled triangle.

ΔADC + ΔBDC = ΔABC

$\Rightarrow a + \Delta BDC = \frac{1}{2} \times 5 \times 12 = 30$

$\Rightarrow \Delta BDC = (30 - a)$ sq. units.

19. (1)



AB = BC = CA = $2a$

Area of ΔABC $= \frac{\sqrt{3}}{4} \times (2a)^2$

$= \sqrt{3}a^2$

Area of three sectors

$= 3 \times \frac{60}{360} \times \pi a^2 = \frac{\pi a^2}{2}$

$\therefore$ Area of shaded region

$= \sqrt{3}a^2 - \frac{\pi a^2}{2}$

$= a^2\left(\sqrt{3} - \frac{\pi}{2}\right)$ sq.units

20. (2) Required increase

$= \left(20 + 20 + \frac{20 \times 20}{100}\right)\%$

= 44%

21. (1) If the length of wire be h cm, then

$\pi r^2 h = 66$

$\Rightarrow \frac{22}{7}\left(\frac{1}{20}\right)^2 \times h = 66$

$\Rightarrow h = \frac{66 \times 400 \times 7}{22}$

= 8400 cm

= 84 metre