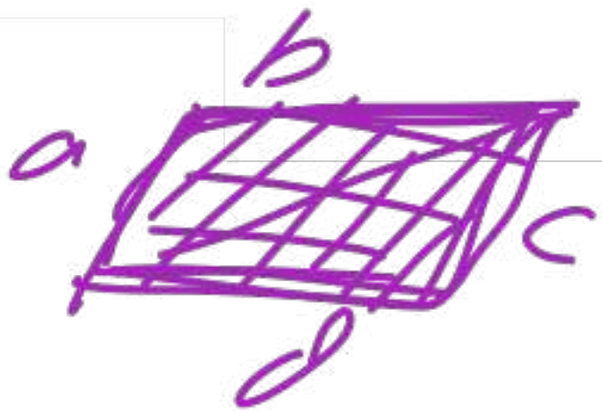
MENSURATION

- Perimeter (परिधि) :- Sum of length of all external boundary / सभी बाहरी सीमा की लंबाई का योग

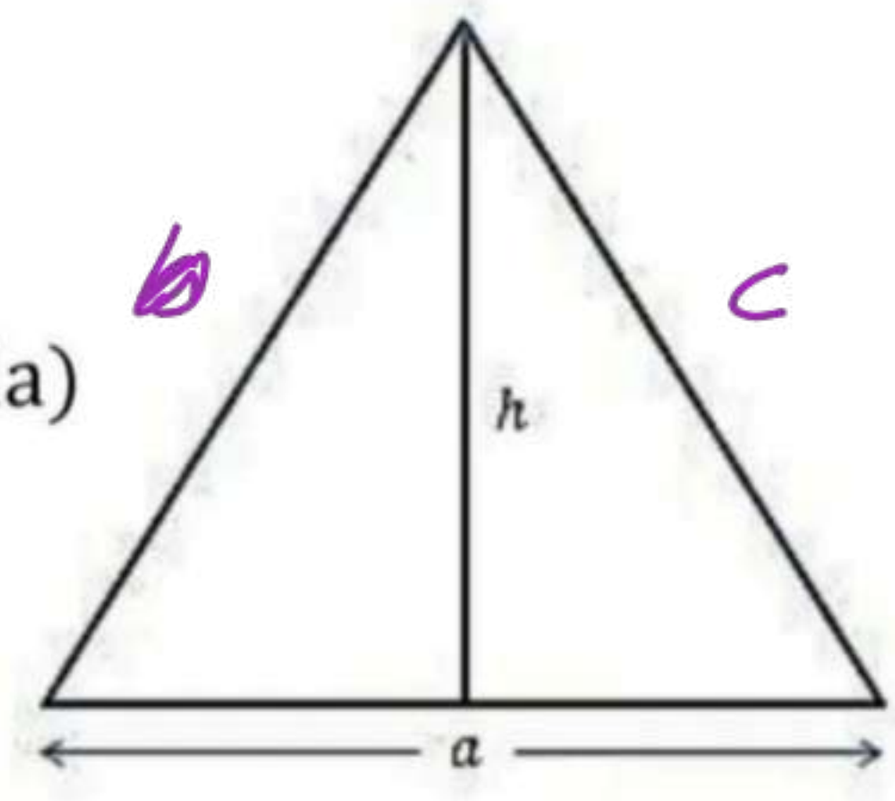
- Area (क्षेत्रफल):- Region covered by external boundary / बाहरी सीमा द्वारा कवर किया गया क्षेत्र



❑ Area of different triangles / विभिन्न त्रिभुजों का क्षेत्रफल

1. $Area$ / क्षेत्रफल$(\Delta) = \frac{1}{2}\ a \times h$

$\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ (Hero's formula)



$$r = \frac{\Delta}{s}$$

$r = inradius\ of\ incircle$

(अन्त:वृत की अंत:त्रिज्या)

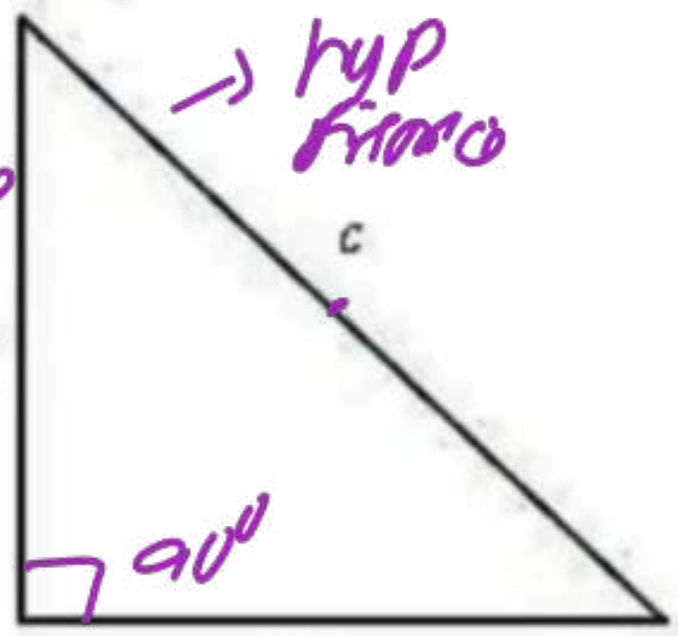
$s = semiperimeter\ of\ triangle = \frac{a+b+c}{2} = s$

(त्रिभुज का अर्धपरिमाप)

3. Right angle triangle / समकोण त्रिभुज

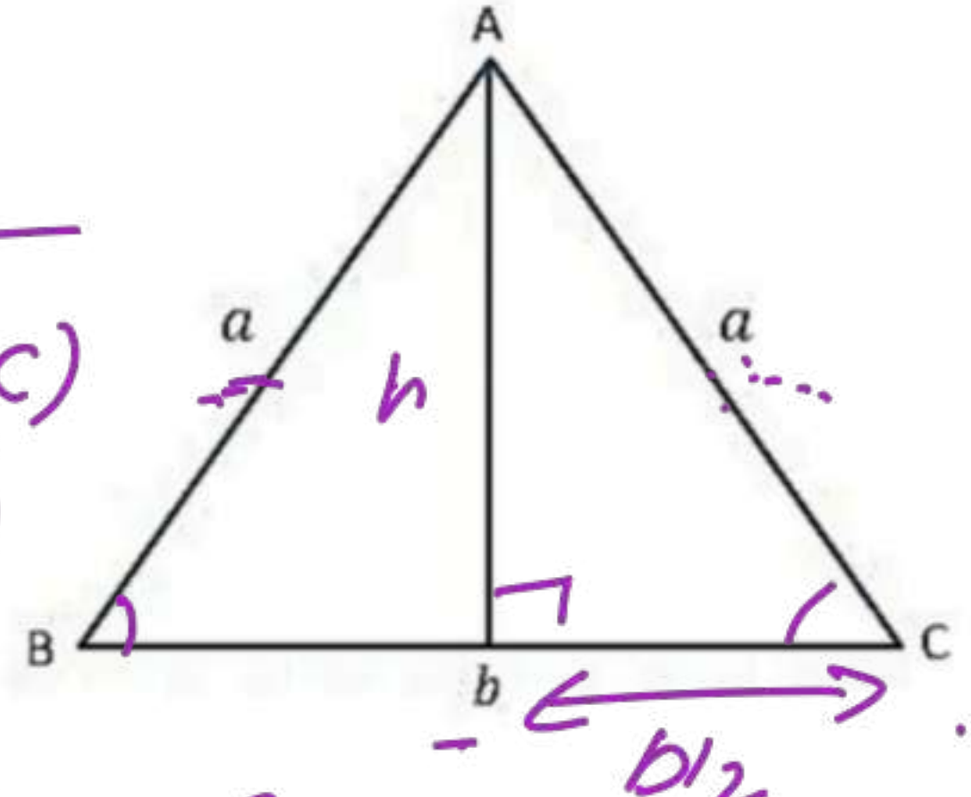
(a, b and c are sides of triangle / a, b और c त्रिभुज की भुजाएँ हैं)

- Perimeter(परिधि) = $a + b + c$
- $c^2 = a^2 + b^2$
- $\Delta = \frac{1}{2} a \times b$
- $R = \frac{c}{2}$, $r = \frac{a+b-c}{2}$



4. Isosceles Triangle / समद्विबाहु त्रिभुज

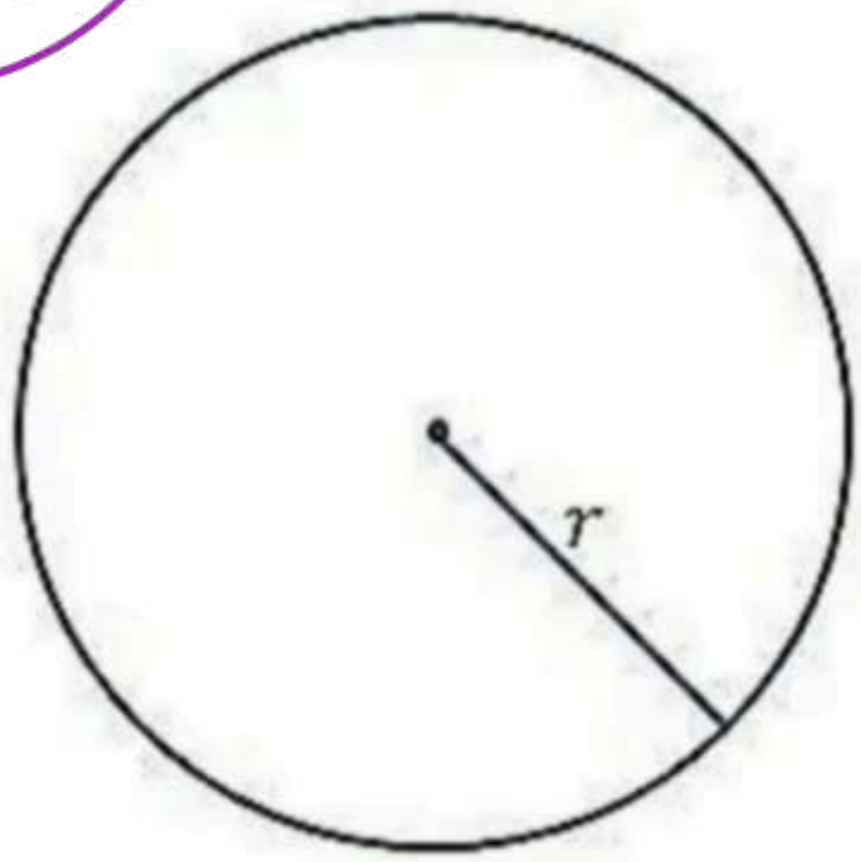
- $\angle B = \angle C$
- $\Delta = \frac{1}{4} b\sqrt{4a^2 - b^2}$
- Perimeter $= 2s = 2a + b$
- Altitude(ऊंचाई) $= \frac{1}{2}\sqrt{4a^2 - b^2}$



❑ Circle (वृत्त) : – வட்டம்

- Circumference(परिधि) = $2\pi r$
- Area(Δ) = πr^2

$\pi = \frac{22}{7}$



r - Radius - ஆரம்

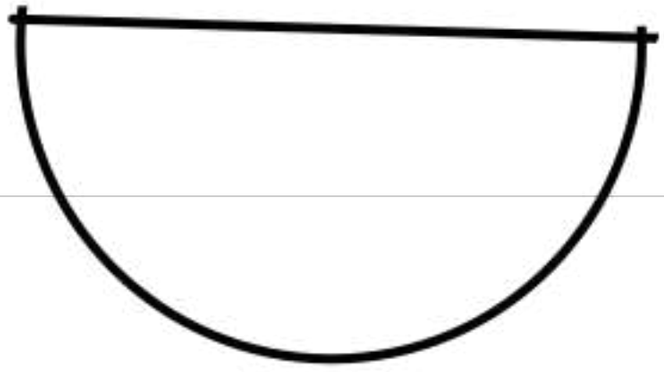
D - Diameter - விட்டம்

$r = \frac{D}{2}$

Semi Circle - அரை வட்டம்

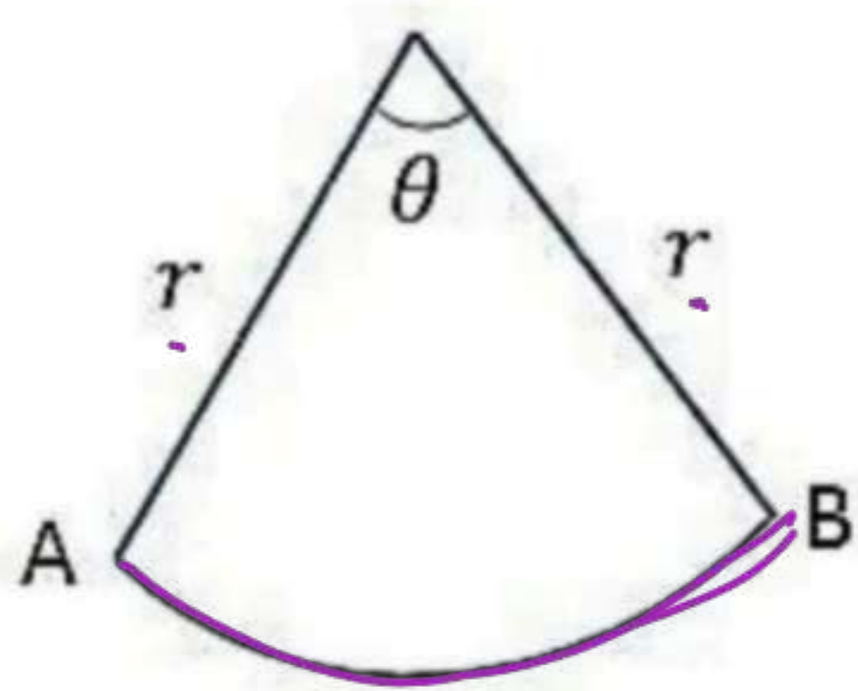
$$\text{Area} = \frac{1}{2}\pi r^2$$

$$\text{Perimeter} = \pi r + 2r$$



❑ Arc (चाप) :

- Arc $AB = \frac{\theta}{360°} \times 2\pi r$
- $\Delta = \frac{\theta}{360°} \times \pi r^2$

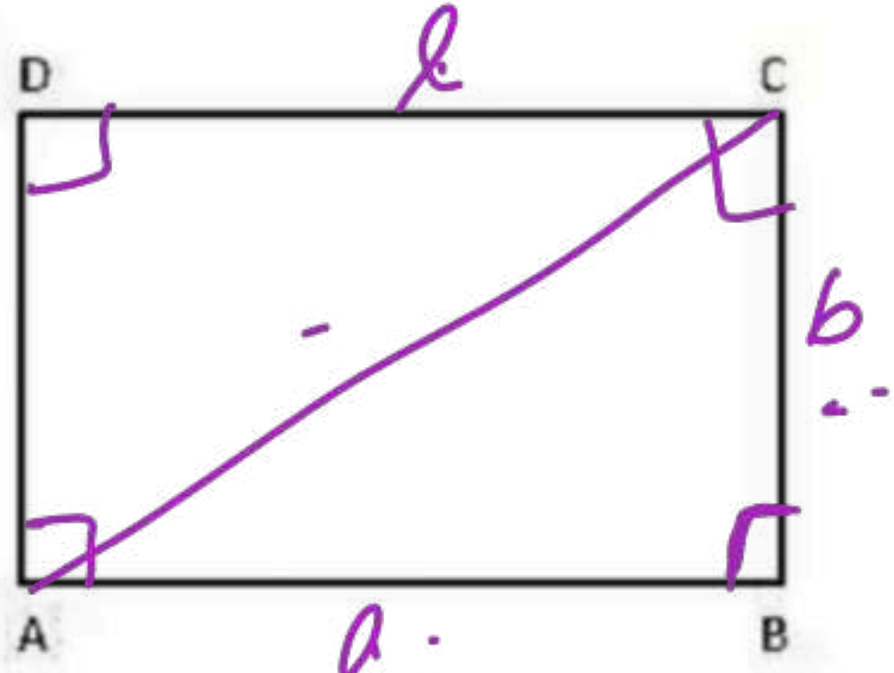


$360° = 2\pi r$

$\theta = \frac{\theta}{360} \times 2\pi r$

❑ Rectangle (आयत) : Rectangle of length(लंबाई) 'l' and breadth(चौड़ाई) 'b']

செவ்வகம்



- Perimeter (परिमाप) = $2(l + b)$ = l+b+l+b = 2l+2b = 2(l+b)
- Δ (क्षेत्रफल) $= l \times b$

- Diagonal (विकर्ण) = $\sqrt{l^2 + b^2}$

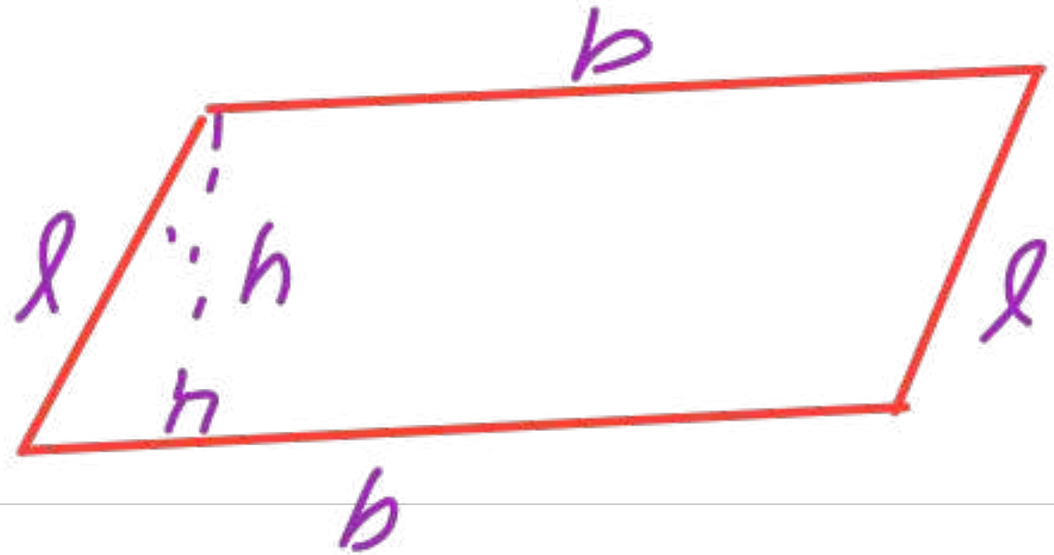
$d^2 = l^2 + b^2$

$d = \sqrt{l^2 + b^2}$

Parallelogram - இணைகரம்

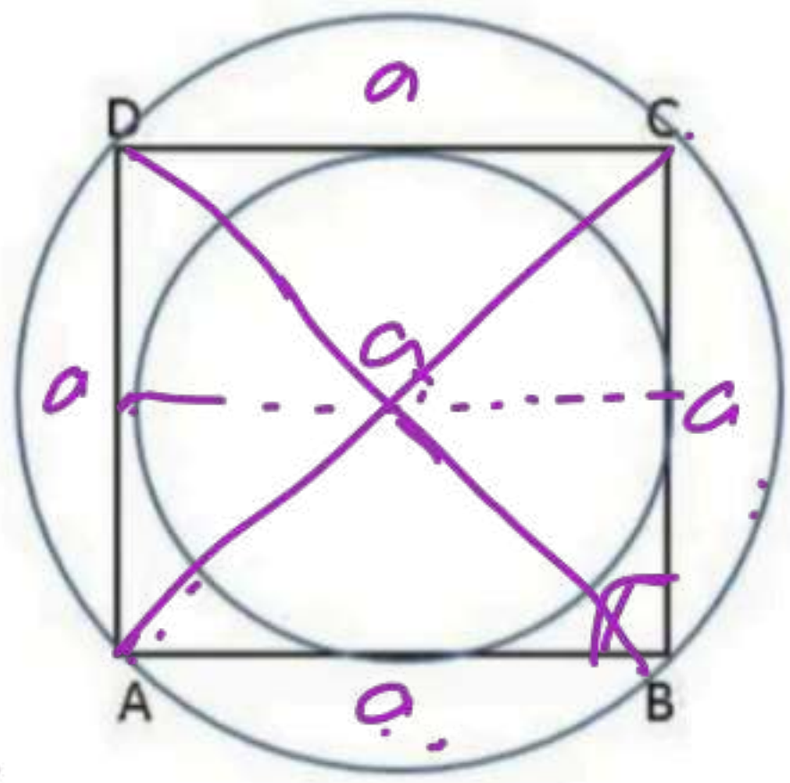
Area = b x h ✓

Perimeter = a+b+c+d = 2(l+b)



- Square (वर्ग) : Square of side a

- Perimeter (परिमाप) = $4a$
- Δ(क्षेत्रफल) $= a^2$
- Diagonal (विकर्ण) = $\sqrt{2}$ a
- $R = \frac{a\sqrt{2}}{2}$
- $r = \frac{a}{2}$

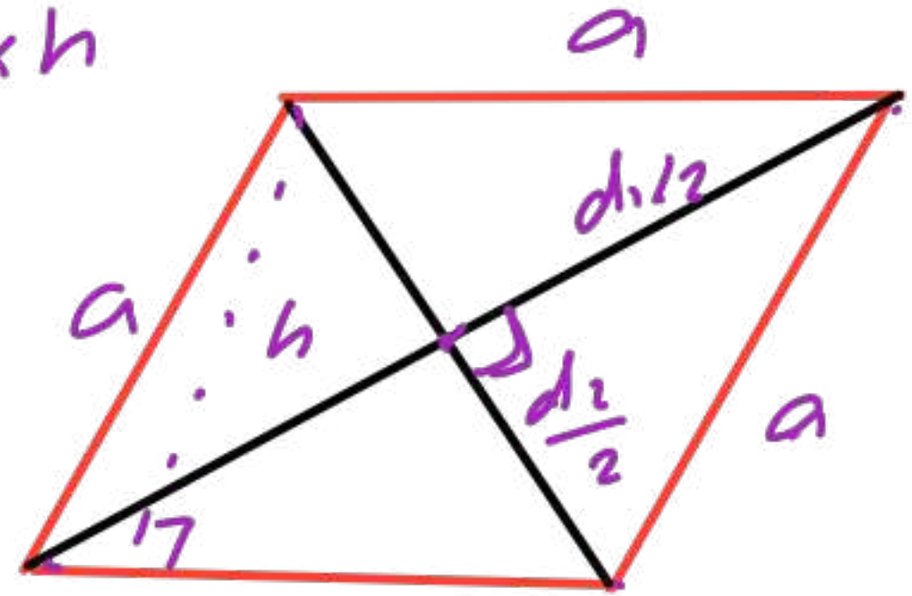


Rhombus - சாய்சதுரம்

$$\text{Area} = \frac{d_1 \times d_2}{2} \quad \text{or} \quad a \times h$$

$$d_1^2 + d_2^2 = 4a^2$$

$$h = \frac{d_1 \times d_2}{2a}$$



$d_1 \neq d_2$

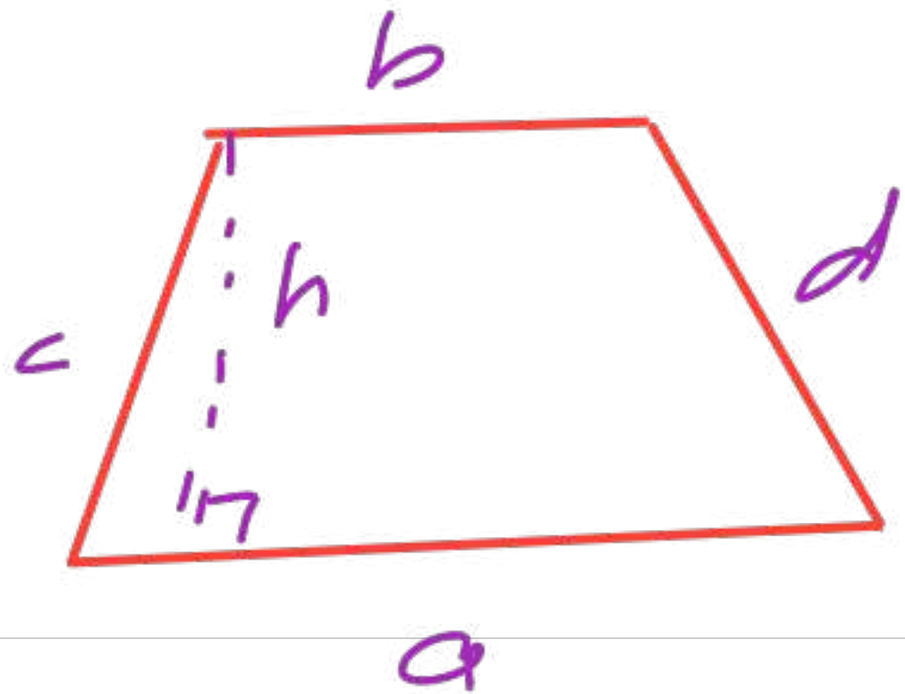
$$a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$$

$$a^2 = \frac{d_1^2}{4} + \frac{d_2^2}{4} \Rightarrow d_1^2 + d_2^2 = 4a^2$$

Trapezium - சரிவகம்

Area $= \frac{1}{2}(a+b) \times h$

Perimeter: $a+b+c+d$



Area m^2

$l \times b$ m^2

$m \times m$ $cm \times cm$ cm^2 mm^2

Volume m^3

$l \times b \times h$ m^3 cm^3

$m \times m \times m$ m^3

MENSURATION 3D

SURFACE AREA & VOLUME

1) Cube
2) Cuboid
3) Cylinder
4) Cone
5) Sphere
6) Hemisphere
7) Prism
8) Pyramid

18
2
20

(3)

- CUBOID
- CUBE
- CYLINDER
- PRISM
- VOLUME=

  Area of base x height
- LSA =

  Perimeter of base x height
- TSA =

  LSA +2 X Area of base

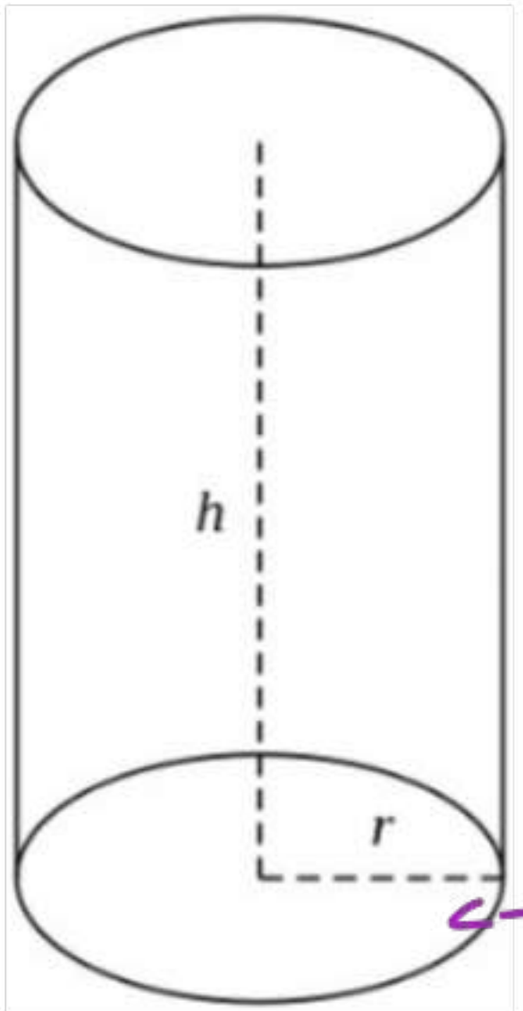
- CONE
- PYRAMID
- TETRAHEDRON
- SPHERE
- HEMISPHERE
- VOLUME=

  1/3 x Area of base x height
- LSA =

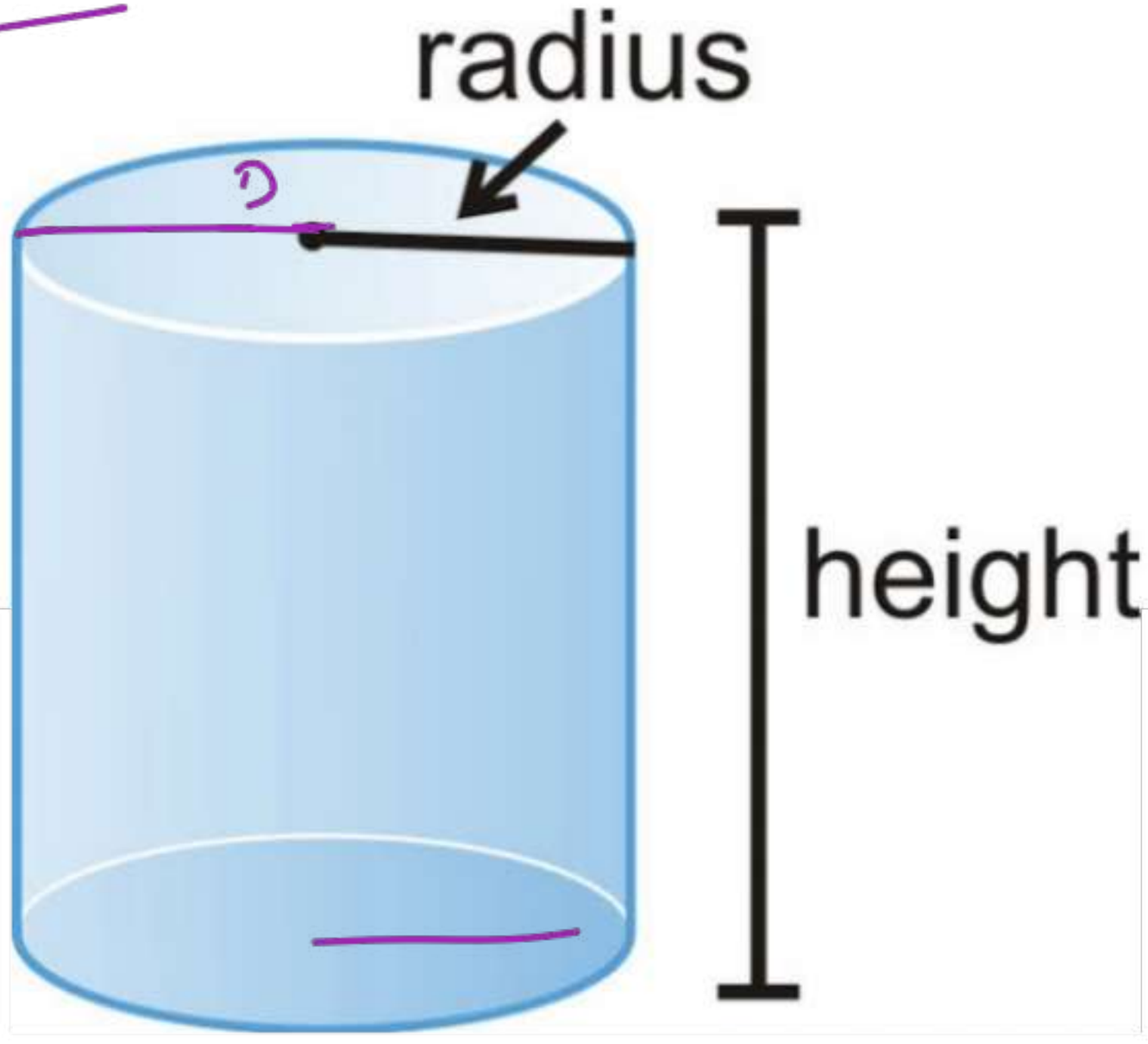
  1/2 x Perimeter of base x height
- TSA =

  LSA + Area of base

Cylinder



← base



Cylinder - 2 Forms

Volume: $\pi r^2 h$ = Area of base x height

LSA = $2\pi r h$ = Perimeter of base x h

TSA = $2\pi rh + 2\pi r^2$ = $2\pi r(r+h)$ = LSA + Area of Top & bottom

LSA - Lateral Surface Area

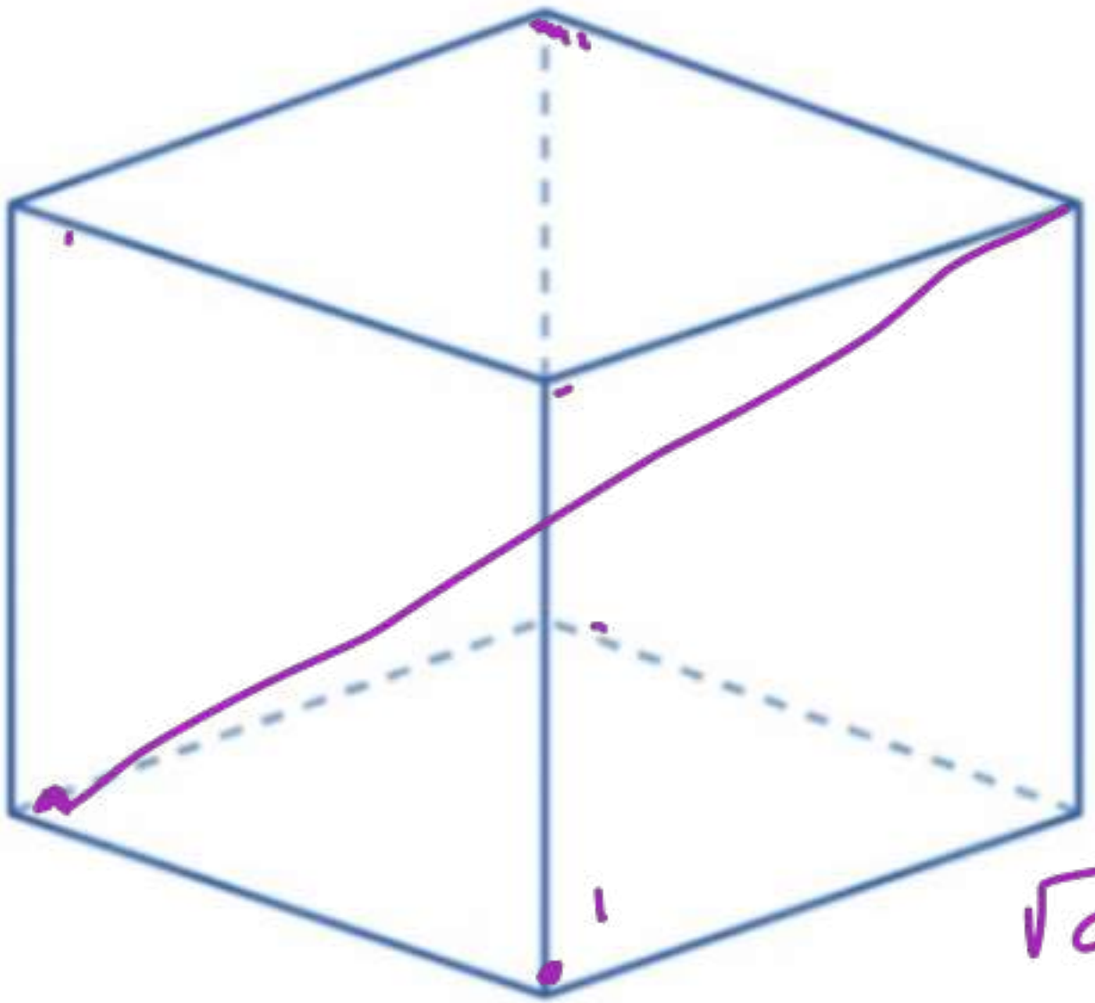
TSA - Total " "

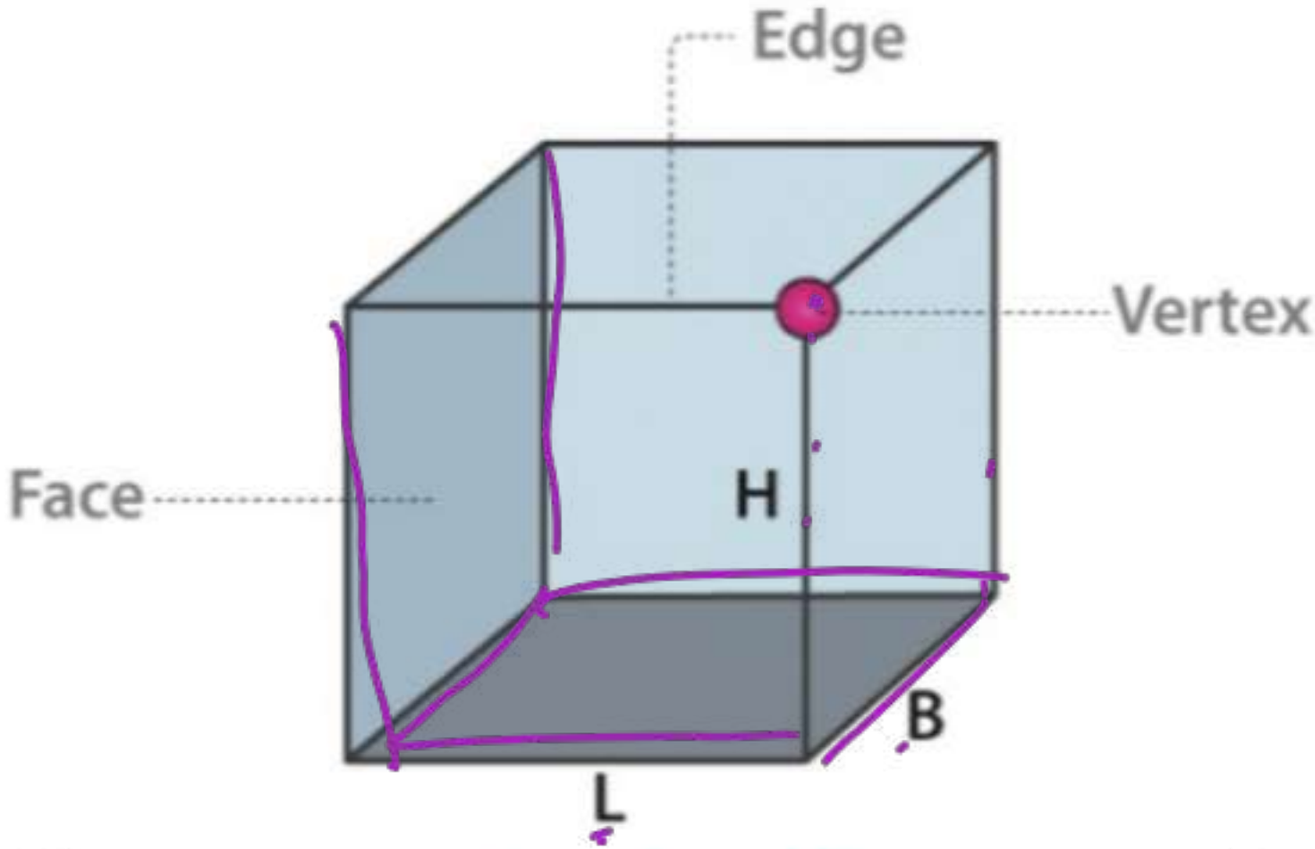
r - radius

h: height

r: $\frac{D}{2}$

Cube - கனசதுரம்





$\sqrt{a^2+a^2+a^2} = \sqrt{3a^2}$

$= a\sqrt{3}$

$= a\sqrt{3}$

L = B = H = a : side

edge

$a^2 \times a = a^3$

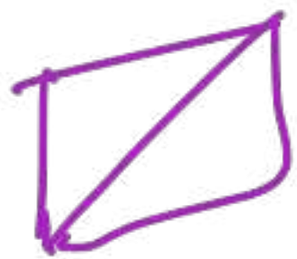
Cube

Volume $= a^3$

LSA $= 4a^2$

TSA $= 6a^2$

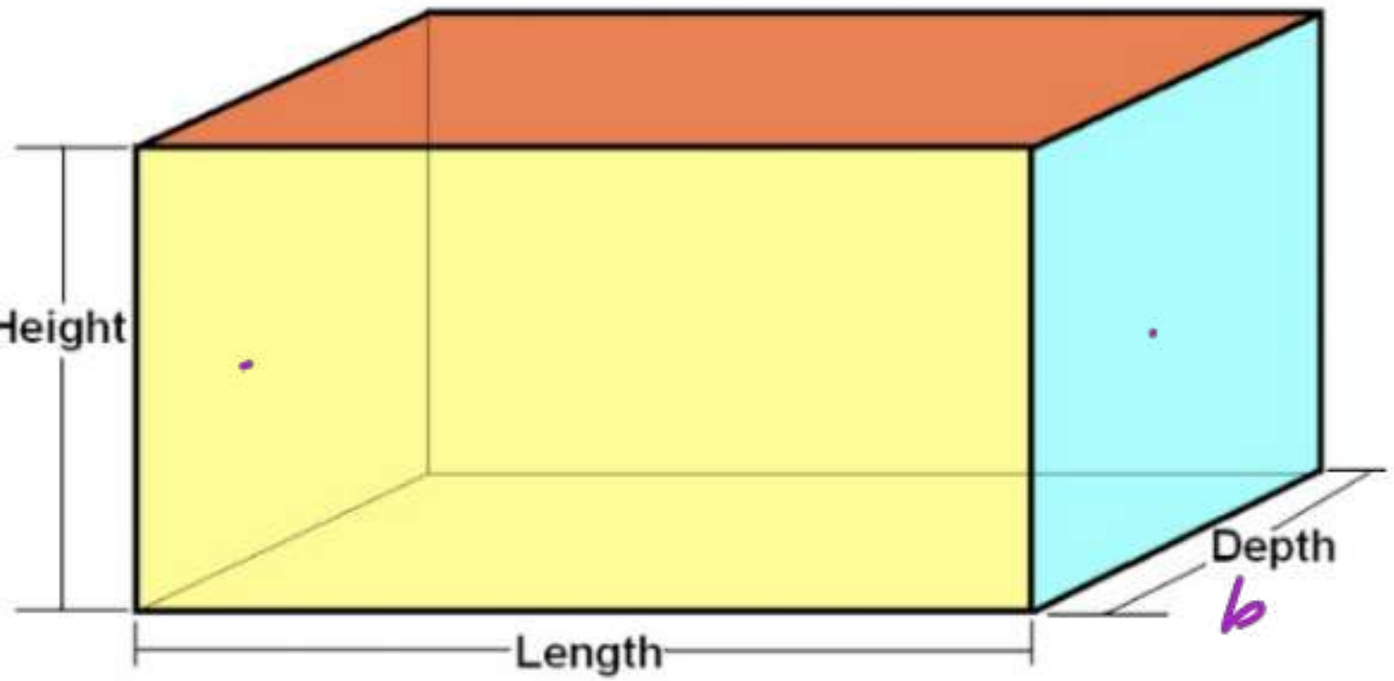
Diagonal $= \sqrt{3} \times a = a\sqrt{3}$



Cuboid - கன வெல்வகம்

$2(l \times h) + 2(b \times h)$

$2lh + 2bh = 2h(l+b)$



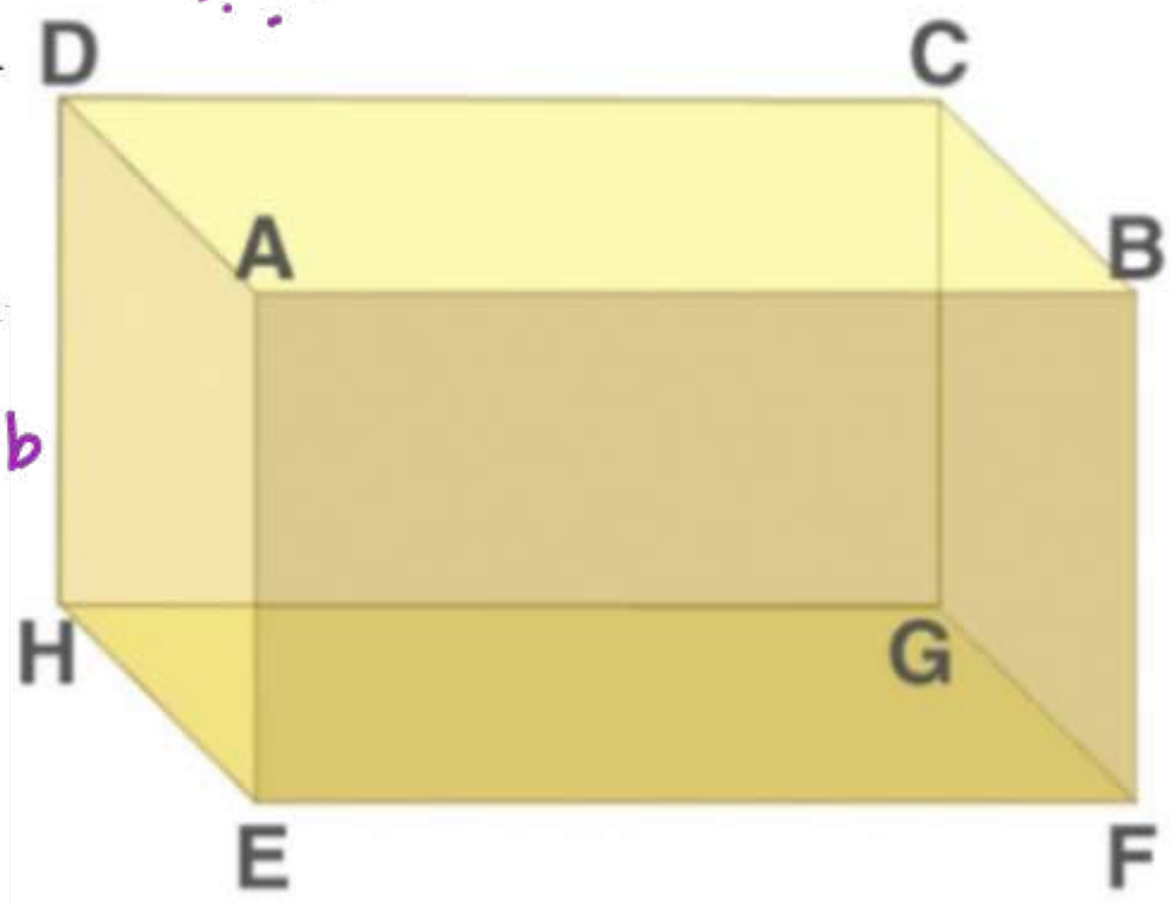
L + H ± D

b

$l \times b \times h$

$2lh + 2bh + 2lb$

$2(lh + bh + lb)$



Cuboid

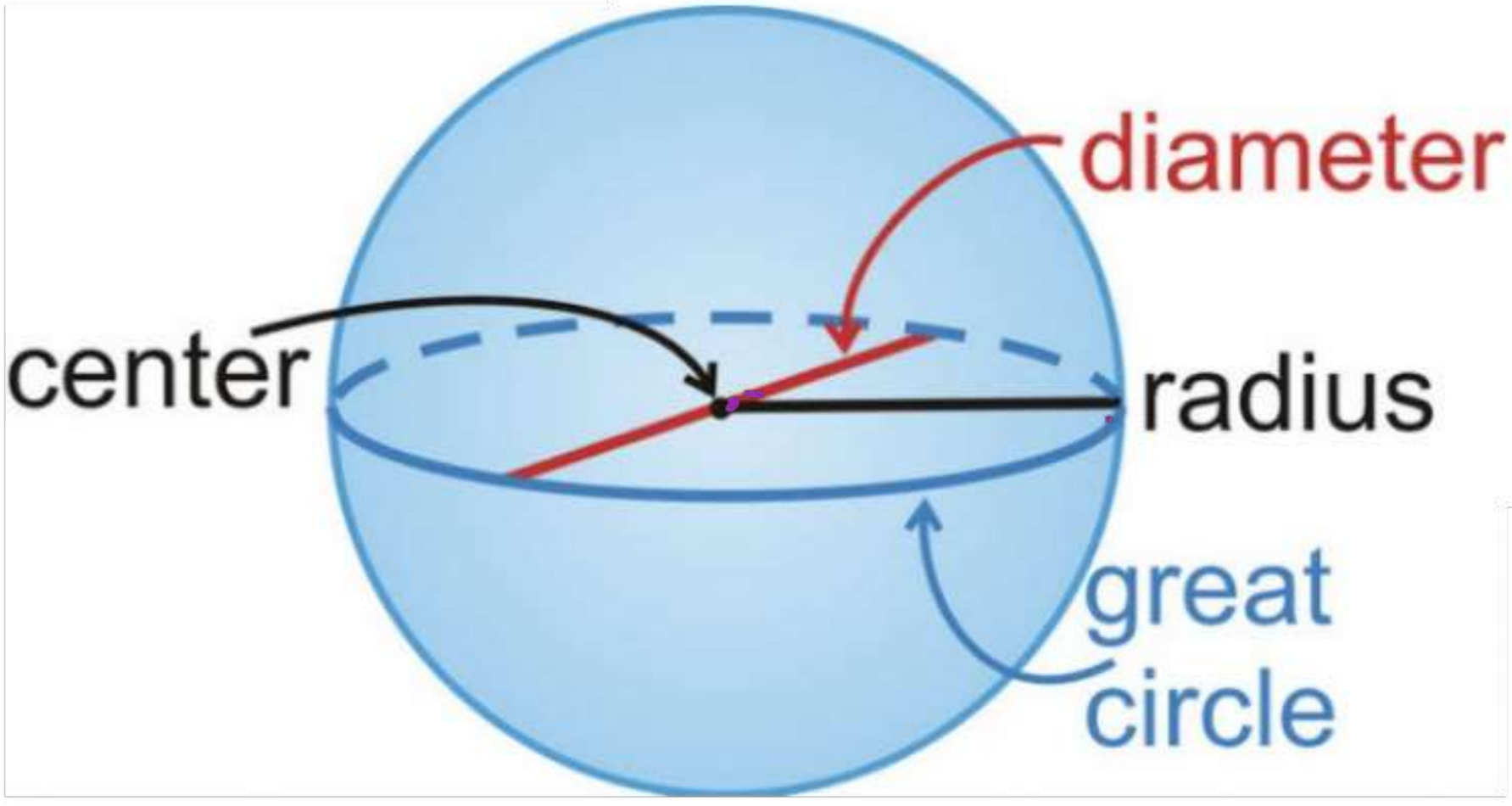
Volume: lbh

LSA: $2h(l+b)$

TSA: $2(lh+bh+lb) = 2(lb+bh+lh)$

Diagonal: $\sqrt{l^2+b^2+h^2}$

sphere – கோளம்



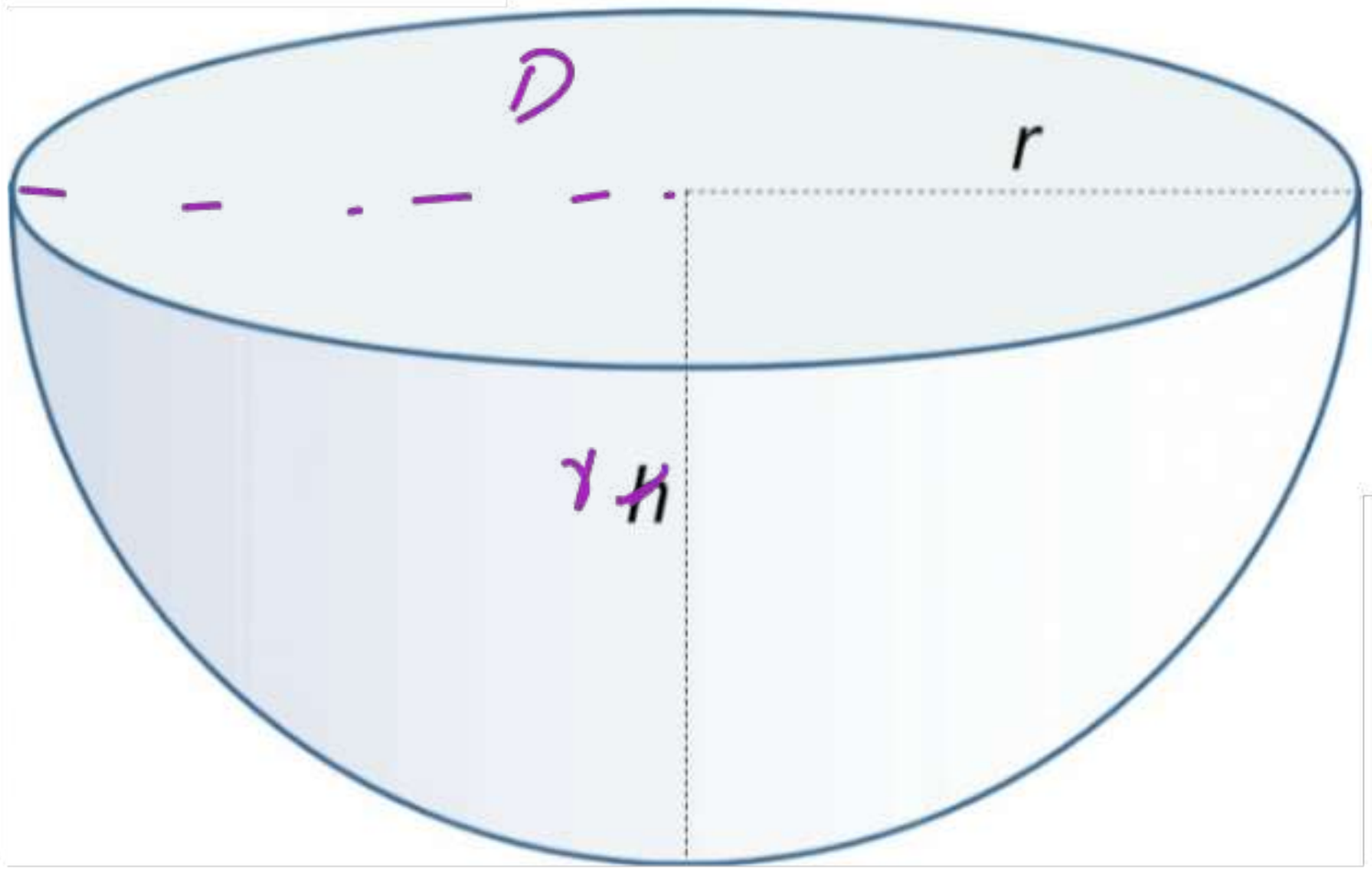
Sphere

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

LSA $= 4\pi r^2$

TSA $= 4\pi r^2$

Hemisphere - Полусфера



Hemisphere

$\frac{2}{3}\pi r^3$

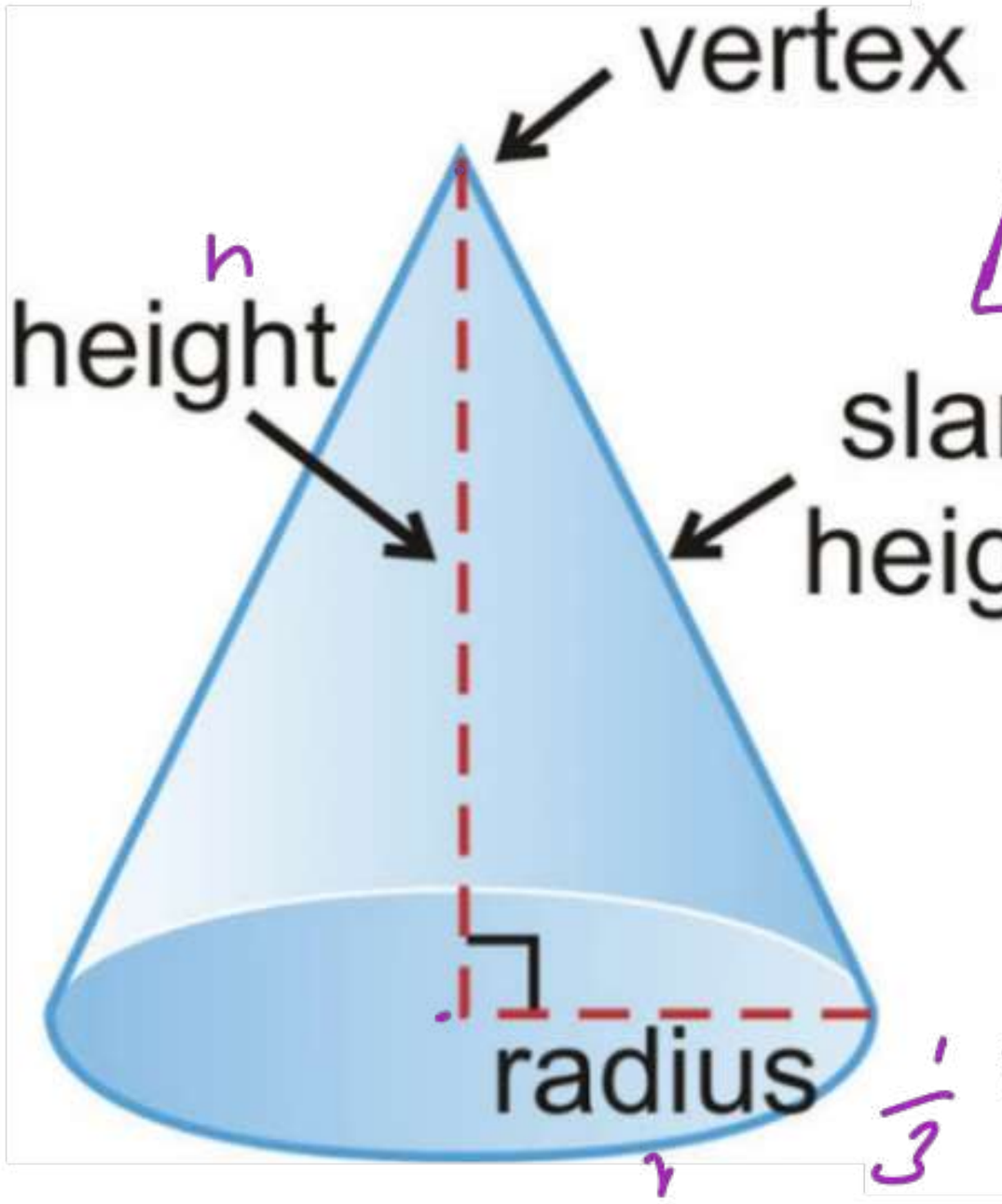
$$\text{Volume} = \frac{2}{3}\pi r^3$$

$$\text{LSA} = 2\pi r^2$$

$$\text{TSA} = 2\pi r^2 + \pi r^2 = 3\pi r^2$$

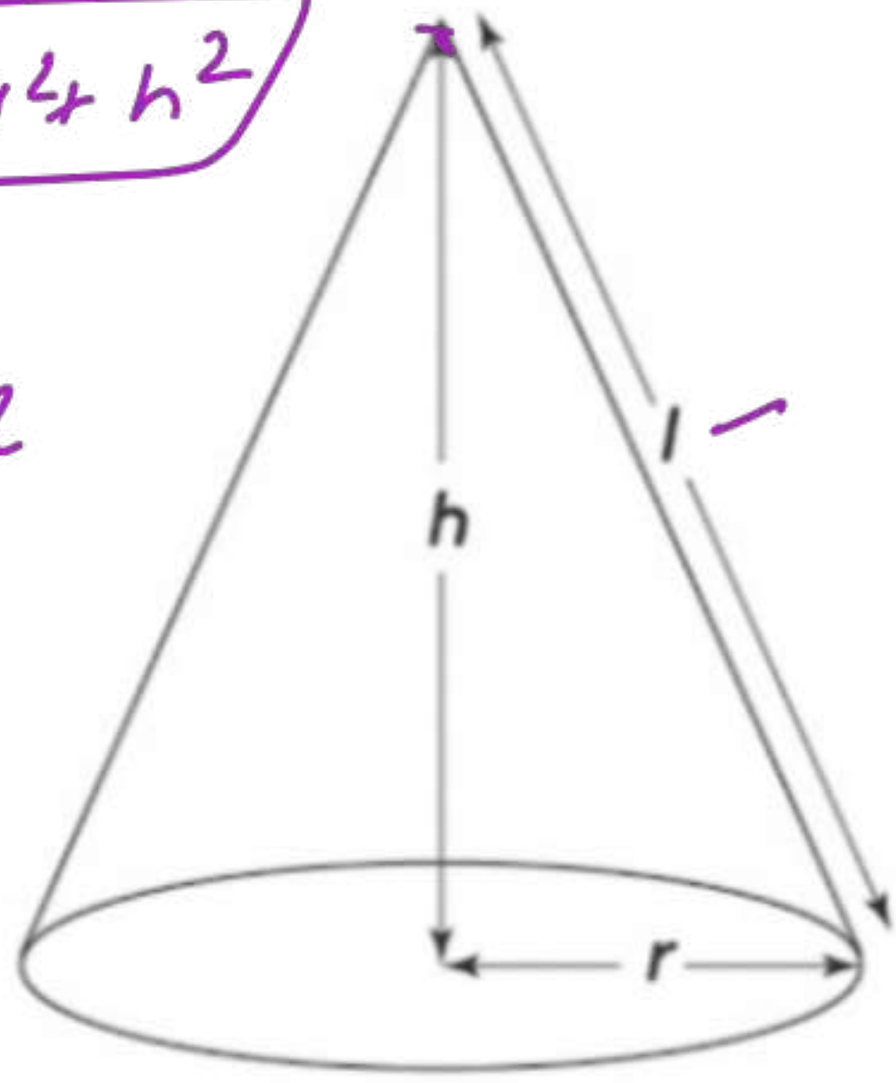
cone - קונוס

$\ell^2 = r^2 + h^2$



ℓ

$\frac{1}{3}\pi r^2 h$



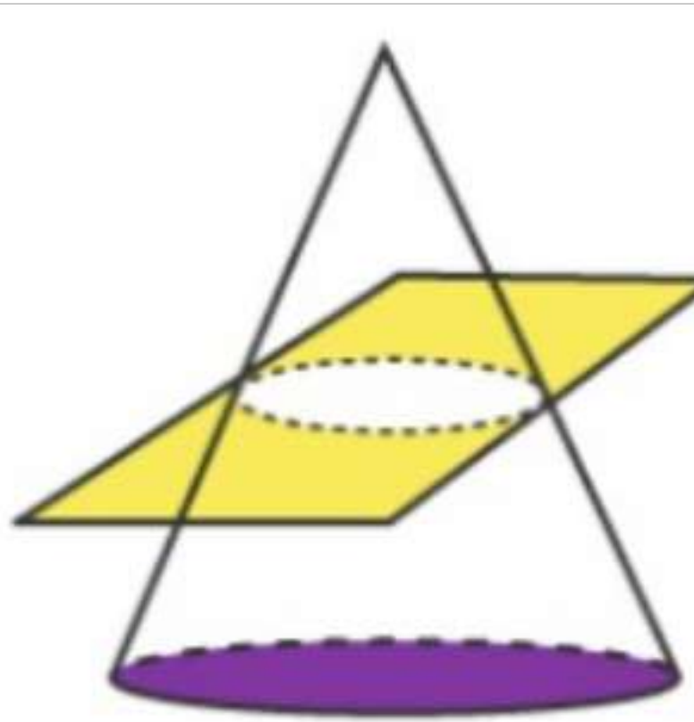
Cone

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

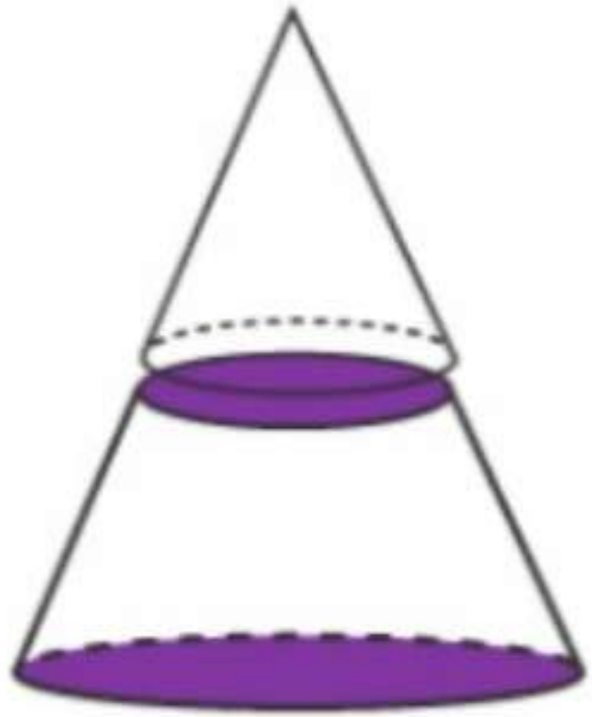
LSA $= \pi r l$

TSA $= \pi r l + \pi r^2 = \pi r (l + r)$

$l^2 = h^2 + r^2 \rightarrow l = \sqrt{h^2 + r^2}$

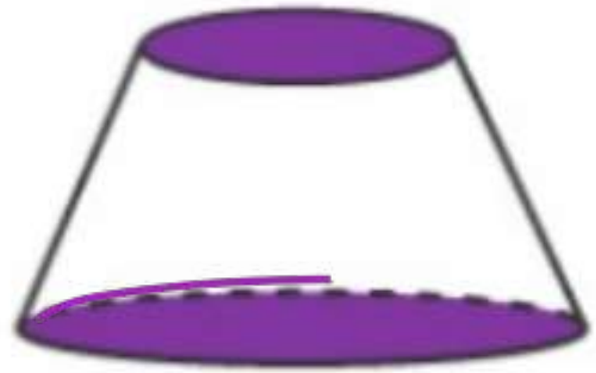


Plane parallel to base cuts the cone



Cone as two separate parts

Frustum of cone



Frustum of a cone

volume $= \frac{1}{3}\pi(R^2+r^2+R.r)h$

CSA $= \pi(R+r)l$

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

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

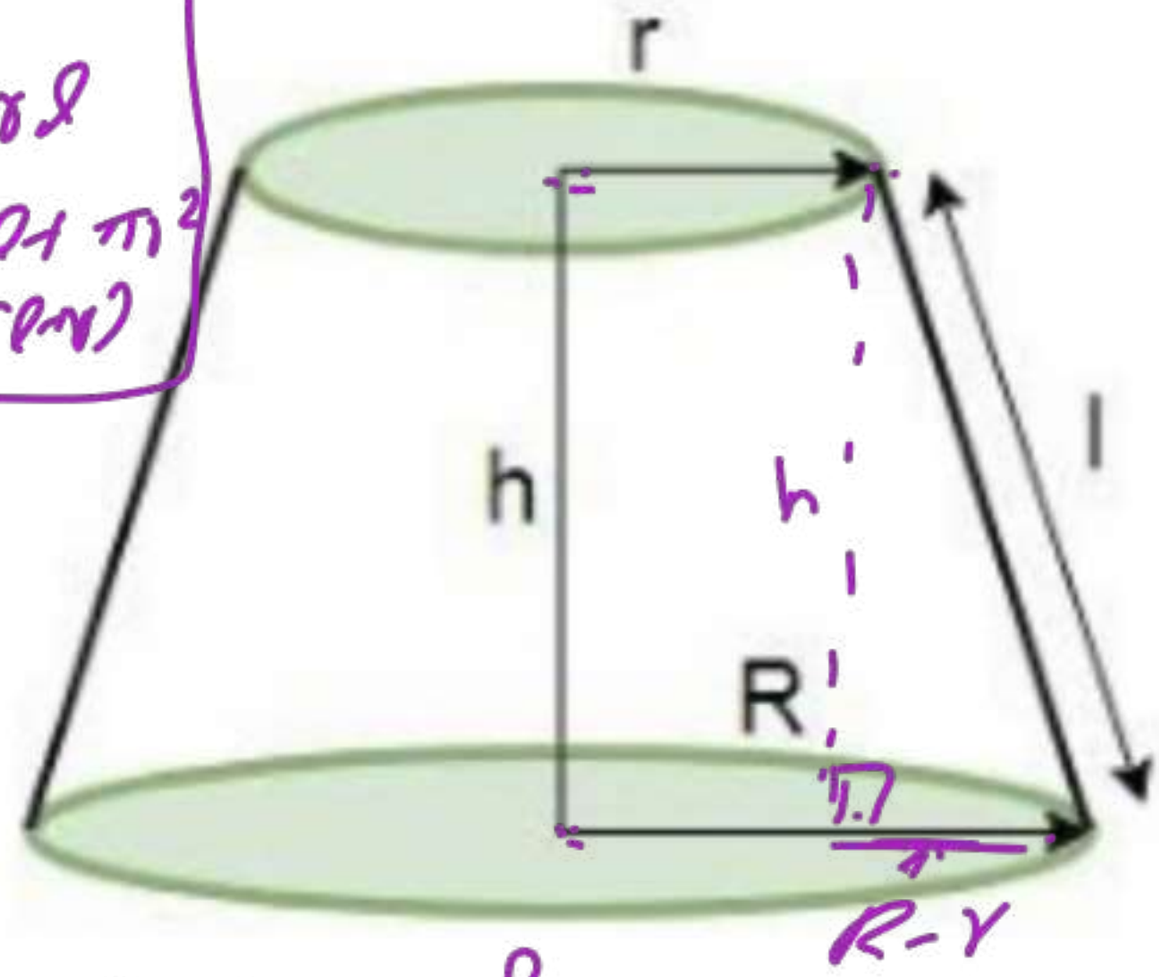
$l^2 = h^2 + (R-r)^2$

$\frac{1}{3}\pi r^2 h$

$\pi r l$

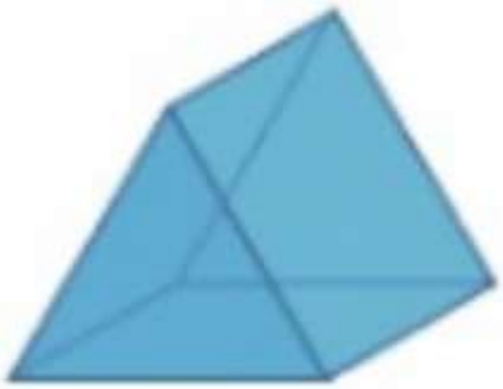
$\pi r l + \pi r^2$

$\pi r(l+r)$

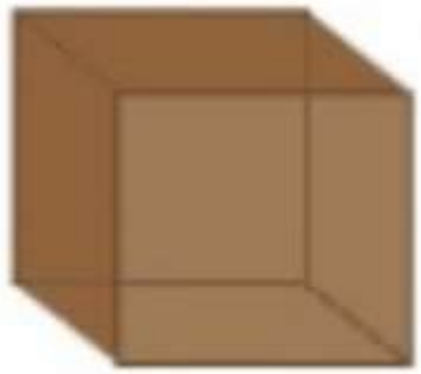


Curved = Lateral

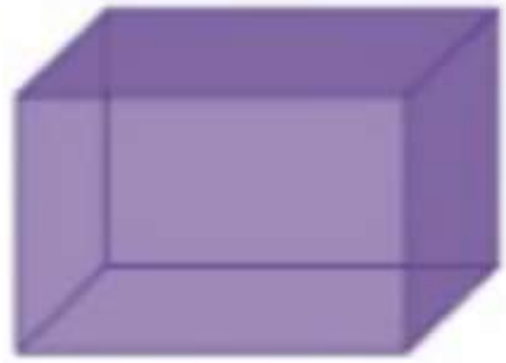
PRISMS



Triangular prism



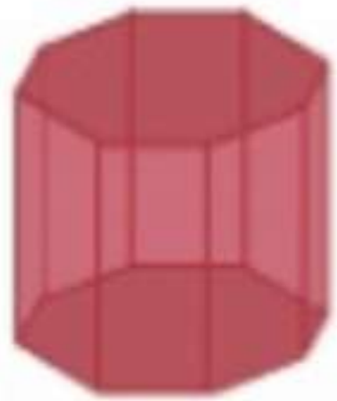
Square prism



Rectangular prism

Pentagonal prism

Hexagonal prism



Octagonal prism

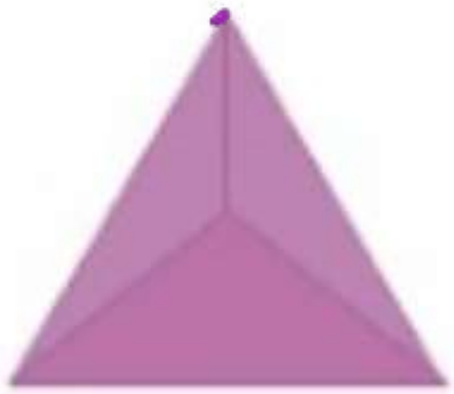
Prism

Volume = Area of base x height

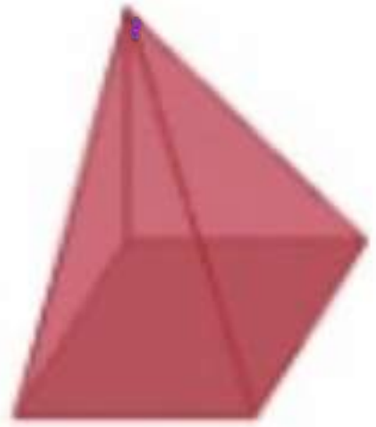
LSA = Perimeter of base x height

TSA = LSA + 2 x Area of base

PYRAMIDS



Triangular pyramid



Square pyramid

Rectangular pyramid

Pentagonal pyramid

Hexagonal pyramid

Octagonal pyramid

Pyramid

Volume = $\frac{1}{3}$ Area of base × height

LSA = $\frac{1}{2}$ Perimeter of base × height

TSA = LSA + Area of base

What is the area of a triangle whose sides are 7 cm, 24 cm and 25 cm?

1. 72 cm^2
2. 108 cm^2
3. 84 cm^2 ✓
4. 42 cm^2

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

$= \sqrt{28 \times 21 \times 4 \times 3}$

$= \sqrt{4 \times 7 \times 7 \times 3 \times 4 \times 3}$

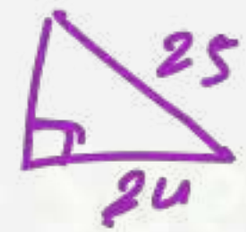
$= 84\ cm^2$

$a = 7,\ b = 24,\ c = 25$

$7^2 + 24^2 = 25^2$

$49 + 576 = 625$

$625 = 625$



$A = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 24 \times 7 = 84\ cm^2$

$s = \frac{a+b+c}{2} = \frac{7+24+25}{2}$

$s = \frac{56}{2} = 28$

The area of a rhombus is 300 cm^2 . If the length of one of the diagonals of the rhombus is 30 cm, then what is the length (in cm) of the second diagonal?

1. 25
2. 10
3. 20
4. 30

$$A = \frac{d_1 \times d_2}{2}$$

$$300 = \frac{d_1 \times 30}{2}$$

$$d_1 = 20 \text{ cm}$$

If the lengths of the diagonals of a rhombus are 24 cm and 18 cm, then what is the area of the rhombus?

1. $196\ cm^2$
2. ~~$188\ cm^2$~~
3. ~~$204\ cm^2$~~
4. $216\ cm^2$

$\bar{d}_1 \quad \bar{d}_2$

$A = \frac{d_1 \times d_2}{2}$

$A = \frac{20 \times 18}{2}$ $\quad 180 \quad \frac{24}{9}$

The sides of an isosceles triangles are 10 cm, 10 cm and 12 cm. What is the area of the triangle?

1. $60\ cm^2$ ✗
2. $48\ cm^2$ ✓
3. $40\ cm^2$ ✗

a b c

$s = \frac{32}{2} = 16$

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

$= \sqrt{16 \times 6 \times 6 \times 4}$

$= \sqrt{4^2 \times 6^2 \times 2^2} = 4 \times 6 \times 2 = 48\ cm^2$

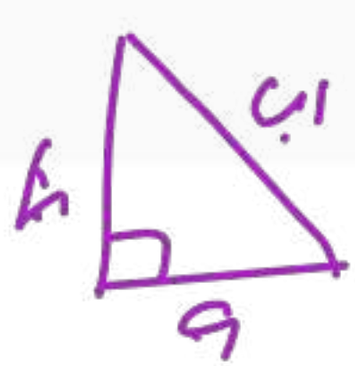
The base and hypotenuse of a right angled triangle are 9 cm and 41 cm respectively. What is the area of the triangle?

1. $180\ cm^2$
2. $170\ cm^2$
3. $190\ cm^2$
4. $160\ cm^2$

$A = \frac{1}{2} \times b \times h$

$A = \frac{1}{2} \times 9 \times 40^{20}$

$= 180\ cm^2$



41×41

41

164

1681

$h^2 + 9^2 = 41^2$

$h^2 = 1681 - 81$

$h = \sqrt{1600} = 40$

The area of a square is 144 cm^2. What is the perimeter of the square formed with the diagonal of the original square as its side?

1. $48\sqrt{2}$ cm ✓
2. 48 cm ✗
3. $24\sqrt{2}$ cm ✗
4. 24 cm ✗

Area $= a^2 = 144$

$a^2 = 12^2$

$a = 12$

$d = a\sqrt{2} = 12\sqrt{2}$

$P = 4a = 4 \times 12\sqrt{2} = 48\sqrt{2}$ cm

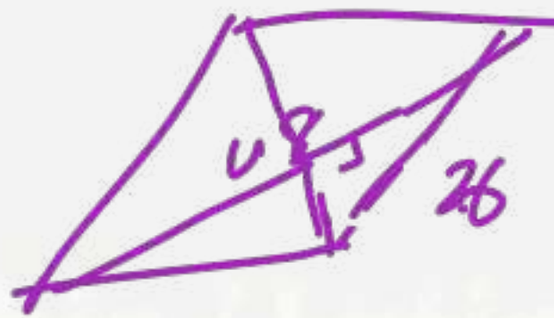
The length of one of the diagonals of a rhombus is 48 cm. If the side of the rhombus is 26 cm, then what is the area of the rhombus?

1. $540\ cm^2$
2. $420\ cm^2$
3. $360\ cm^2$
4. $480\ cm^2$ ✓

Area $= \frac{d_1 \times d_2}{2}$

$= \frac{48 \times 20}{2}$

$= 480\ cm^2$



$d_1^2 + d_2^2 = 4a^2$

$48^2 + d_2^2 = 4 \times 26^2$

$d_2^2 = 2704 - 2304$

$d_2^2 = 400$

$d_2 = 20$

$48 \times 48 = 2304$

$676 - a = 2$

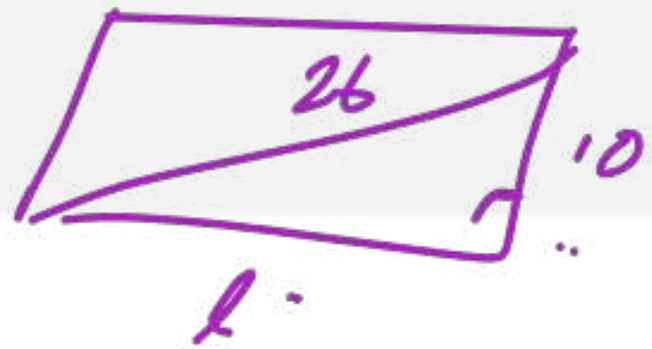
The length of the diagonal of a rectangle is 26 cm and one side is 10 cm. The area of the rectangle is:

✔ 1. $240\ cm^2$

✘ 2. $260\ cm^2$

$A = l \times b$

$= 24 \times 10 = 240$



$d = \sqrt{l^2 + b^2}$

$d^2 = l^2 + b^2$

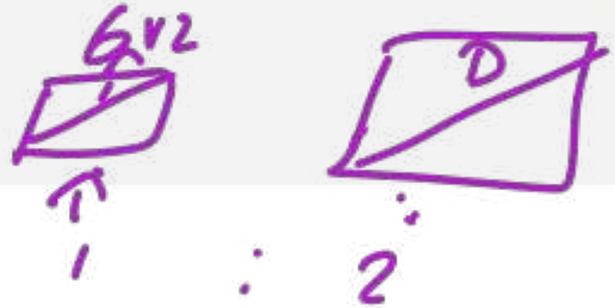
$676 = l^2 + 100 \quad l = 24$

$l^2 = 576 = 24^2$

The diagonal of a square measures $6\sqrt{2}$ cm. The measure of the diagonal of a square whose area is twice that of the first square is:

✔ 1. 12 cm

$d = 6\sqrt{2}$ cm



$A_1 = \frac{d^2}{2} = \frac{6^2 \times 2}{2} = 36$

$A_2 = 2 \times 36 = 72 = \frac{D^2}{2}$.

$D^2 = 144$

$D^2 = 12^2$

$D = 12$

The area of a rectangle is 180 cm^2. If the ratio of length and breadth of the rectangle is 5 : 4, then what is the length (in cm) of diagonal of the rectangle?

1. $\sqrt{423}$
2. $\sqrt{317}$
3. $\sqrt{369}$ ✓
4. $\sqrt{371}$

$l \times b = 180\ cm^2$

$5x \times 4x = 180$

$x^2 = 9$

$x = 3$

$l : b = 5 : 4$

$d = \sqrt{l^2 + b^2}$

$l : b = 5x : 4x$

$l = 5x, \ b = 4x$

$l = 15 \quad b = 12$

$d = \sqrt{225 + 144}$

$= \sqrt{369}$

What is the area of the largest square which can be inscribed in a circle of radius 14 cm?

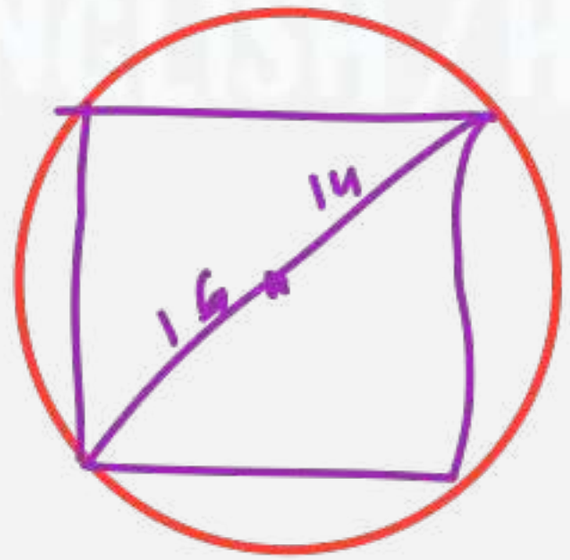
$\left(\text{Take } \pi = \frac{22}{7}\right)$

Dia: 28 = d

$A = \frac{d^2}{2}$

$A = \frac{28 \times 28}{2}$

14



1. 392 cm^2 ✓
2. 484 cm^2 ✗
3. 196 cm^2 ✗
4. 784 cm^2 ✗

What is the circumference of the largest circle which can be inscribed in a square of side 14 cm?

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

1. 66 cm
2. 88 cm
3. 22 cm
4. 44 cm ✓

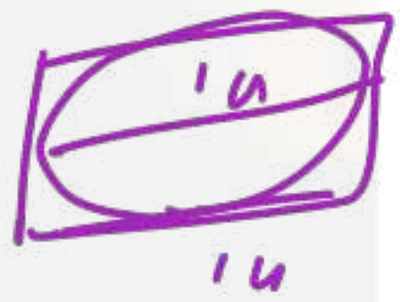
$= 2\pi r$

$= 2 \times \frac{22}{7} \times 7$

$= 44$

$D = 14$

$r = 7$



$r = a/2$

$r = 14/2 : 7$

$r : a/2$

$R = \frac{a\sqrt{2}}{2}$

What is the area of the largest circle which can be inscribed in a square of side 28 cm?

(Take $\pi = \frac{22}{7}$)

1. ~~308~~ cm^2
2. 616 cm^2 ✓
3. 476 cm^2
4. ~~512~~ cm^2

Diameter = Side of square

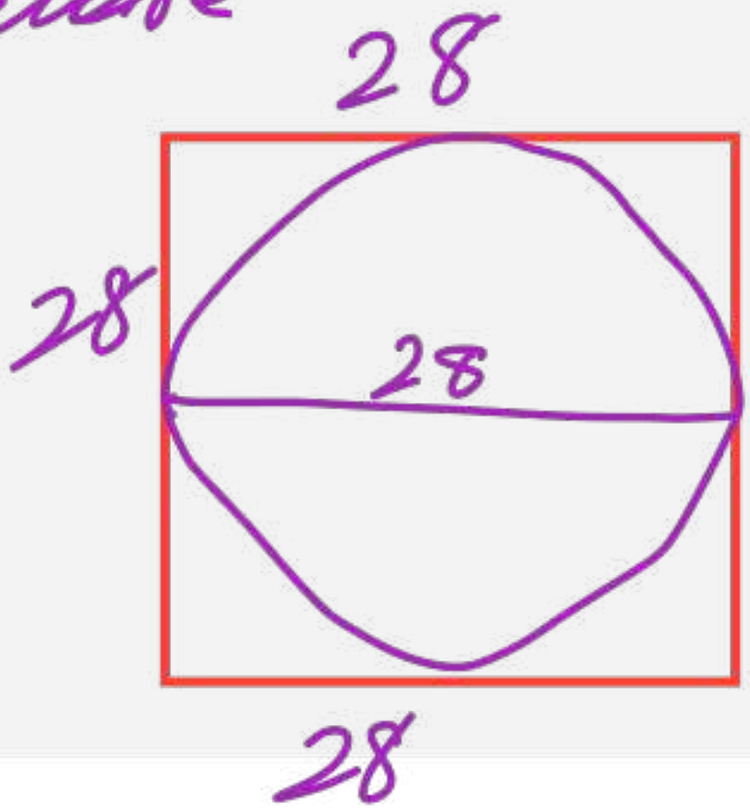
$D = 28$

$r = 14$

$A = \pi r^2$

$= \frac{22}{7} \times 14 \times 14$

$= 616\ cm^2$



28
22
56
56
616

What is the area of the largest square which can be inscribed in a circle of radius 28 cm?

1. $3136\ cm^2$
2. $1568\ cm^2$
3. $784\ cm^2$
4. $196\ cm^2$

r = 28

D = 56 = d

$A = \frac{d^2}{2} = \frac{56 \times 56}{2}$

48

$R = \frac{ar_2}{2}$

$r_2 \times 2 = \frac{2 \times 28 = a}{r_2}$

$a = 28 r_2$

$A = a^2 = 28^2 \times 2$

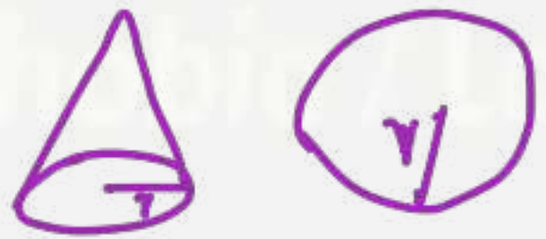
Radius of base of a right circular cone and a sphere is each equal to r. If the sphere and the cone have the same volume, then what is the height of the cone?

1. $7r$
2. $4r$
3. $2r$
4. $3r$

$V_{sphere} = V_{cone}$

$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$

$h = 4r$



The side of a cube is 15 cm. What is the base area of a cuboid whose volume is 175 cm^3 less than that of the cube and whose height is 32 cm?

1. 200 cm^2
2. 100 cm^2
3. 160 cm^2
4. 325 cm^2

$a = 15\ cm$ $\quad h = 32\ cm$

$V_{cuboid} = V_{cube} - 175$

$V_{cuboid} = a^3 - 175$

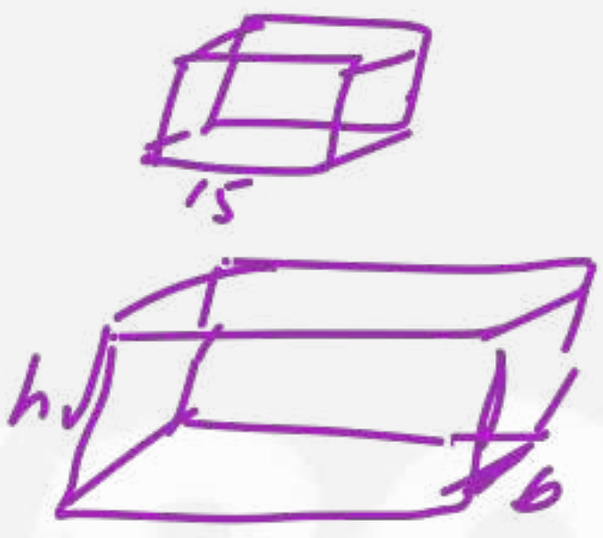
$= 15^3 - 175$

$= 3375 - 175$

$V_{cuboid} = 3200$

$lbh = 3200$

$lb = \frac{3200}{32} = 100$



lxb

$lbh =$

$3375 - 175$

$\frac{3200}{32} : 100$

225

15

The total surface area of a hollow cuboid is 340 cm^2. If the length and the breadth of the cuboid are 10 cm and 8 cm respectively, then what is the length of the longest stick that can be fitted inside the cuboid?

1. 10 cm
2. $4\sqrt{41}$ cm
3. $3\sqrt{21}$ cm
4. 21 cm

TSA = 340 cm^2

$2(lb+bh+hl) = 340$

$10\times8 + 8h + 10h = 170$

$18h = 170 - 80 = 90$

$h = 5$

$l = 10$ $h = 8$

Diagonal $= \sqrt{l^2+b^2+h^2}$

$= \sqrt{100+64+25}$

$= \sqrt{189}$

$= \sqrt{9\times21}$

$= 3\sqrt{21}$

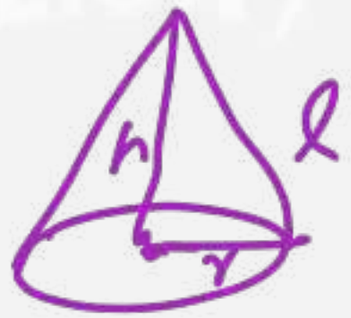
The height of a right circular cone is 5 cm and its base radius is 12 cm. What is the curved surface area of the cone?

1. $132\pi cm^2$
2. $143\pi cm^2$
3. $156\pi cm^2$ ✓
4. $168\pi cm^2$

$CSA = \pi r l$

$= \pi \times 12 \times 13$

$= 156\pi \ cm^2$



$h = 5$ cm

$r = 12$ cm

$l^2 = h^2 + r^2$

$l = \sqrt{25 + 144}$

$l = \sqrt{169}$

$l = 13$

The length, breadth and height of a cuboid are 5 cm, 2 cm and 4 cm respectively. What is the total surface area of the cuboid?

l b h

TSA = 2 (lb + bh + hl)

= 2 × (10 + 8 + 20)

= 2 × 38 = 76 cm²

✗ 1. $84\ cm^2$

✗ 2. $152\ cm^2$

✗ 3. $38\ cm^2$

✓ 4. $76\ cm^2$

The volume of a cube is 216 cm^3 . What is the area of one face of the cube?

1. 36 cm^2 ✓
2. 12 cm^2 ✗
3. 24 cm^2 ✗
4. 30 cm^2 ✗

volume: $a^3 = 216$

$a^3 = 6^3$

$a = 6$

$a^2 = 6 \times 6 = 36$

a^2

The edge of a cube is 8 cm. What is the total surface area of the cube?

1. $128\ cm^2$
2. $256\ cm^2$
3. $384\ cm^2$ ✓
4. $484\ cm^2$

a = 8 cm

TSA = $6a^2$

$= 6 \times 64$

$= 384\ cm^2$

64
6
384 2

A room is in the shape of cube and the length of the longest rod placed in it is $21\sqrt{3}$ cm. The area of the floor is:

1. $441\ cm^2$ ✓
2. $144\ cm^2$ ✗
3. $169\ cm^2$ ✗
4. $961\ cm^2$ ✗

Diagonal = $21\sqrt{3}$

$a\sqrt{3} = 21\sqrt{3}$

$a = 21$

$a^2 = 21^2 = 441$

The area of the sheet metal needed to make a box of size 7 cm × 8 cm × 9 cm is:

1. 382 cm^2
2. 156 cm^2
3. 412 cm^2
4. 139 cm^2

TSA: $2(lb+bh+hl)$

$= 2(56+72+63)$

$= 2 \times 191 = 382$

l b h

The volume of prism is 308 cm^3 and height is 11 cm. The base area of prism is:

1. 21 cm^2
2. 14 cm^2
3. 28 cm^2
4. 22 cm^2

$V = \text{Base Area} \times h$

$308 = BA \times 11$

$BA = 28 cm^2$

The total surface area of a hemisphere is 462 cm^2. What is its diameter?

(Take $\pi = \frac{22}{7}$)

1. 14 cm
2. 7 cm
3. 17.5 cm
4. 10.5 cm

TSA: $3\pi r^2 = 462$

$3 \times \frac{22}{7} \times r^2 = 462$

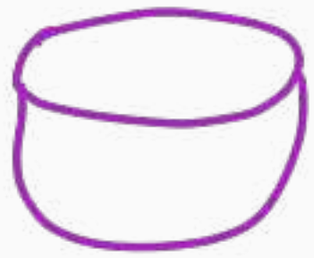
$\frac{66}{7} r^2 = \frac{462 \times 7}{66}$

$r^2 = \frac{3 \times 22}{2}$

$r^2 = 7^2$

$r = 7$

$D = 2 \times 7 = 14$ cm



What is the total surface area of a cone which has a radius of 21 cm and a height of 28 cm?

(Take $\pi = \frac{22}{7}$)

1. $3696\ cm^2$
2. $1848\ cm^2$
3. $5544\ cm^2$
4. $7392\ cm^2$

TSA = $\pi r l + \pi r^2$

$= \pi r(l + r)$

$= \frac{22}{7} \times 21^3 (35 + 21)$

$= 22 \times 3 \times 56$

$= 3696$

$r = 21\ cm$

$h = 28$

$l^2 = h^2 + r^2$

$l = \sqrt{28^2 + 21^2}$

$= \sqrt{784 + 441}$

$= \sqrt{1225}$

$l = \sqrt{35^2} = 35$

5 | 1225

5 | 245

7 | 49

7

$7^2 \times 5^2 = 7 \times 5 = 35$

A hemisphere of radius 30 cm is moulded to form a cylinder of height 180 cm. The diameter of the cylinder is:

1. 15 cm
2. 10 cm
3. 5 cm
4. 20 cm ✓

$V_{hemisphere} = V_{cylinder}$

$\frac{2}{3}\pi r^3 = \pi R^2 h$

$V = V$

$\frac{2}{3} \times \frac{\overset{10}{\cancel{30}} \times \overset{5}{\cancel{30}} \times 30}{\underset{1}{\cancel{180}}} = R^2$

$R^2 = \sqrt{2 \times 10 \times 5}$

$= \sqrt{2 \times 1 \times 5 \times 5}$

$R = 2 \times 5 = 10$

$D = 2R = 2 \times 10 = 20$

If the volumes of two cubes are in the ratio of 64 : 125, then what is the ratio of their total surface areas?

1. 9 : 16
2. 4 : 5
3. 16 : 25
4. 64 : 125

$\frac{a_1^3}{a_2^3} = \frac{64}{125}$

$\frac{a_1^3}{a_2^3} = \frac{4^3}{5^3}$

$\frac{a_1}{a_2} = \frac{4}{5}$

$a_1^3 : a_2^3 = 4^3 : 5^3$

$a_1 : a_2 = 4 : 5$

$6a_1^2 : 6a_2^2$

$\frac{6a_1^2}{6a_2^2} = \left(\frac{a_1}{a_2}\right)^2$

$= \left(\frac{4}{5}\right)^2 = \frac{4^2}{5^2}$

$= \frac{16}{25}$

The radii of a right circular cone and a right circular cylinder are in the ratio 2 : 3. If the ratio of the heights of the cone and the cylinder is 3 : 4, then what is the ratio of the volumes of the cone and the cylinder?

1. 1 : 6
2. 1 : 3
3. 1 : 9
4. 2 : 3

$\frac{r}{R} = \frac{2}{3}$

$\frac{h}{H} = \frac{3}{4}$

Cone Cy
Sm Caps.

$$\frac{\text{Volume of cone}}{V_{\text{Cylinder}}} = \frac{\frac{1}{3}\pi r^2 h}{\pi R^2 H} = \frac{1}{3} \times \frac{r}{R} \times \frac{r}{R} \times \frac{h}{H}$$

$$= \frac{1}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{3}{4}$$

$$= \frac{1}{9} \quad 1:9$$

If height of a circular cone is decreased by 10% and its radius is increased by 10%, then what will be the change in its volume?

1. Decreases by 8.9%.
2. Decreases by 3.2%.
3. Increases by 8.9%.
4. Increases by 3.2%.

$h = \frac{100}{90}$ $\quad r = \frac{100}{110}$

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

$\frac{V_1}{V_2} = \frac{100}{110} \times \frac{100}{110} \times \frac{1000}{90}$

$= \frac{1000}{1089}$

$\frac{V_1}{V_2} = \frac{100}{108.9}$) -8.9

8.9 : ↑

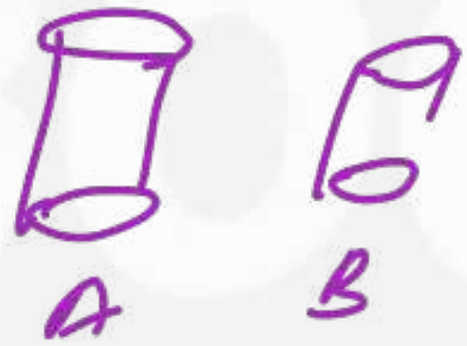
$\frac{121}{9}$ /

$\frac{1089}{}$

The radii of two cylinders A and B are in the ratio of 5 : 6 and the heights are in the ratio of 7 : 4 respectively. The ratio of curved surface area of cylinder B to that of A is:

1. 35 : 24
2. 24 : 35
3. 49 : 35
4. 35 : 49

$\frac{r_A}{r_B} = \frac{5}{6}$ $\frac{h_A}{h_B} = \frac{7}{4}$



CSA: $2\pi rh$

$\frac{CSA_B}{CSA_A} = \frac{2\pi r_B h_B}{2\pi r_A h_A}$

$= \frac{6}{5} \times \frac{4}{7} = \frac{24}{35}$

24 : 35

The volume of a right circular cylinder is 3 times the volume of a right circular cone. The radius of the cone and the cylinder are 3 cm and 6 cm respectively. If the height of the cylinder is 1 cm, then what is the slant height of the cone?

1. $\sqrt{13}$ cm
2. 4 cm
3. 5 cm ✓

Volume

Cylinder	:	Cone
3	:	1
R = 6		r = 3
H = 1		h =

$\frac{V_{cy}}{V_{cn}} = \frac{3}{1}$

$\frac{\pi R^2 H}{\frac{1}{3}\pi r^2 h} = \frac{3}{1} \times \frac{1}{3}$

$R^2H : r^2h$

$h = \frac{R^2H}{r^2} = \frac{36 \times 1}{9} = 4$

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

$= \sqrt{16 + 9} = \sqrt{25}$

$l = 5$

The diameter of a right circular cylinder is decreased to one third of its initial value. If the volume of the cylinder remains the same, then the height becomes how many times of the initial height?

1. 1
2. 9
3. 6
4. 3

$V = \pi r^2 h$

$\frac{1}{3}$ D $\frac{3}{1}$ $r = D/2 \cdot \frac{3}{1}$

$\frac{N}{V} = \frac{3}{1} \times \frac{3}{1} \times \frac{x}{y}$

$\frac{3/2}{1/2}$

$\frac{h_1}{h_2}$ $r_1/r_2 = \frac{1}{9}$ $1 \times 9 = 9$

A rectangular paper of width 7 cm is rolled along its width and a cylinder of radius 9 cm is formed. The volume of the cylinder is:

(Take $\pi = 22/7$)

1. $1525\ cm^3$
2. $900\ cm^3$
3. $1750\ cm^3$
4. $891\ cm^3$

$V = \pi r^2 h$

$V = \frac{22}{7} \times 9 \times 9 \times 7$

$= 1782\ cm^3$

$\frac{81}{22}$

$\frac{162}{162}$

$\frac{162}{1782}$

5. $1782\ cm^3$

A sphere is inscribed in a cube. What is the ratio of the volume of the cube to the volume of the sphere?

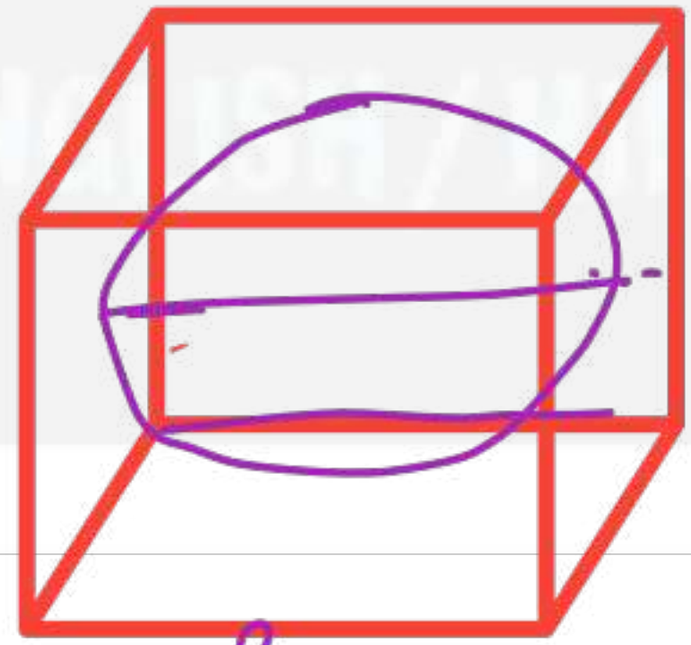
1. $6 : \pi$
2. $8 : \pi$
3. $11 : 2\pi$
4. $9 : 2\pi$

$$\frac{V_{cube}}{V_{sphere}} = \frac{a^3}{\frac{4}{3}\pi r^3}$$

$$= \frac{3a^3}{4 \times \pi \times \frac{a^3}{2^3}}$$

$$= \frac{3 \times 8^2}{4\pi}$$

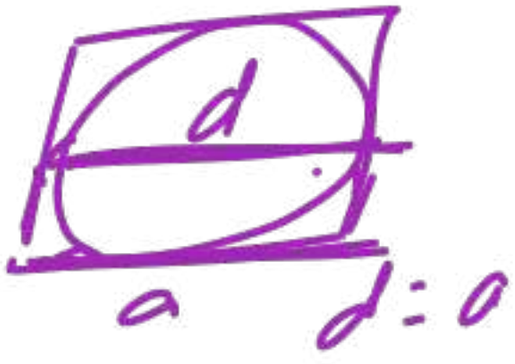
$$\frac{V_{cub}}{V_{sp}} = \frac{6}{\pi} \quad 6 : \pi$$



$a : d$

$r : \frac{d}{2}$

$r : \frac{a}{2}$



The height of a right circular cone is 24 cm and the radius of its base is 7 cm. What is the cost of painting the curved surface area of the cone at the rate of ₹6 per cm^2?

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

1. ₹3600
2. ₹3300 ✓
3. ₹880
4. ₹4200

h = 24 cm

r = 7 cm

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

$= \sqrt{576 + 49}$

$l = \sqrt{625} = 25$

CSA $= \pi r l$

$= \frac{22}{7} \times 7 \times 25$

CSR $= \frac{22 \times 25 \times 6}{150}$

$= 22 \times 150$

$= 3300$

1 cm² 6

22 / 7 = 1 / 110 / 22 / 3300

A room is in the shape of a cuboid, with dimensions 12m × 10m × 3m. What is the cost of painting the four walls of the room at the rate of ₹50 per m^2 ?

1. ₹15000
2. ₹15600
3. ₹6600
4. ₹7500

l b h

$LSA = 2h(l+b)$

$= 2 \times 3 \times 22$

$LSA = 132\ m^2 \times 50$

$= 6600$

$2lh + 2bh$

$132 \times 50 = 6600$

The radius of a hemisphere is 14 cm. What is the cost of painting the outer curved surface of the hemisphere at the rate of ₹45 per cm^2 ?

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

1. ₹53160
2. ₹55440
3. ₹56820
4. ₹58280

CSA = $2\pi r^2$

Cost = $2 \times \frac{22}{7} \times 14 \times 14 \times 45$

$= 44 \times 90 \times 14$

$= 44 \times 9 \times 14 \times 10$

$6 \quad 0$

0.1 percent of 1.728×10^6 spherical droplets of water, each of diameter 2 mm, coalesce to form a spherical bubble. What is the diameter (in cm) of the bubble?

1. 1.2
2. 1.6
3. 1.8
4. 2.4 ✓

$1.728 \times 10^6 \times \frac{0.1}{1000} = 10^3$

$\frac{1.728 \times 1000000}{1000} = 1728$

$1728 \times \frac{4}{3}\pi 1^3 = \frac{4}{3}\pi R^3$

$R^3 = 1728$

$R^3 = 12^3$

$R = 12$

$D = 24$ mm $= 2.4$ cm

round → 1.728×10^6

0 0 0 0 0 0

2mm → 0 0 0 0 0 0

$r = 1$mm

R $1 - 15^3$

1 mm = $\frac{1}{10}$ cm

10 mm = 1 cm

A rectangular park was redesigned and as a result of which its length increased by 50%. If the area of the park, remained unchanged, then by how much percentage had the breadth been reduced?

1. 25
2. 50
3. 33.33
4. 40.33

$A = l \times b$

$\therefore \frac{A}{A} = \frac{100}{150} \times \frac{x}{y}$

$x : y = \frac{150}{100} \downarrow -50$

$\% \text{ change} = \frac{50}{150} \times 100 = 33.33\% \checkmark$

KM	Hecto.M	Deco.M	M	deci.M	CM	MM
1 KM	10 HM	100	1000	10000	100000	1000000
	1	10	100	1000		

10 hecto M : 1KM

10 Deco M : 1 Hecto M

KM	HECM	DecM	M	decim	CM	MM
			1	10	100	

1M : 100CM

The sides of a triangular park are 200 m, 210 m and 290 m. The area of the park (in hectares) is:

1. 2.4
2. 1.8
3. 2.1 ✓
4. 2.9

M
200
210
290

Hec.M
2
2.1
2.9

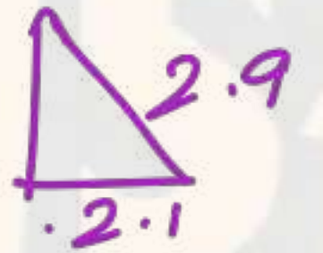
KM HEC.M DECO.M M

1 10 100

$2^2 + 2.1^2 = 2.9^2$

$4 + 4.41 = 8.41$

$8.41 = 8.41$ ✓



$S = \frac{7}{2} = 3.5$

$A = \sqrt{3.5 \times 1.5 \times 1.4 \times 0.6}$

$= \sqrt{\frac{35}{10} \times \frac{15}{10} \times \frac{14}{10} \times \frac{6}{10}}$

$A = \frac{1}{2} \times b \times h = \frac{1}{2} \times 2.1 \times 2.1 \times 2.1$

$A = 2.1\ h$

$A = \frac{1}{100}\sqrt{7 \times 5 \times 3 \times 5 \times 7 \times 2 \times 3 \times 2}$

$= \frac{7 \times 5 \times 2 \times 3}{100} = \frac{210}{100} = 2.1$

What is the area (in m^2) of a triangular field whose sides measure 25 m, 39 m and 56 m?

1. 210
2. 240
3. 420 ✓
4. 480

a b c

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

$S = \frac{120}{2} = 60$

$= \sqrt{60 \times 35 \times 21 \times 4}$

10×6
$5 \times 2 \quad 3 \times 2$

$= \sqrt{5 \times 2 \times 3 \times 2 \times 7 \times 5 \times 7 \times 3 \times 4}$

$= 5 \times 2 \times 3 \times 7 \times 2$

$= 420 m^2$

The diagonal of a square is equal to the side of an equilateral triangle. If the area of the square is $18\sqrt{3}$ sq. cm. What is the area (in cm^2) of the equilateral triangle?

1. $54\sqrt{2}$
2. $27\sqrt{2}$
3. 54
4. 27

Area of square $= \frac{d^2}{2}$

$d = a$

$\frac{d^2}{2} = 18\sqrt{3}$

$d^2 = 18\sqrt{3} \times 2$

$a^2 = 18\sqrt{3} \times 2$

Area $\Delta = \frac{\sqrt{3}}{4} a^2$

$= \frac{\sqrt{3}}{4} \times 18 \times \sqrt{3} \times 2$

$= \frac{9}{2}$

$= 3 \times 9$

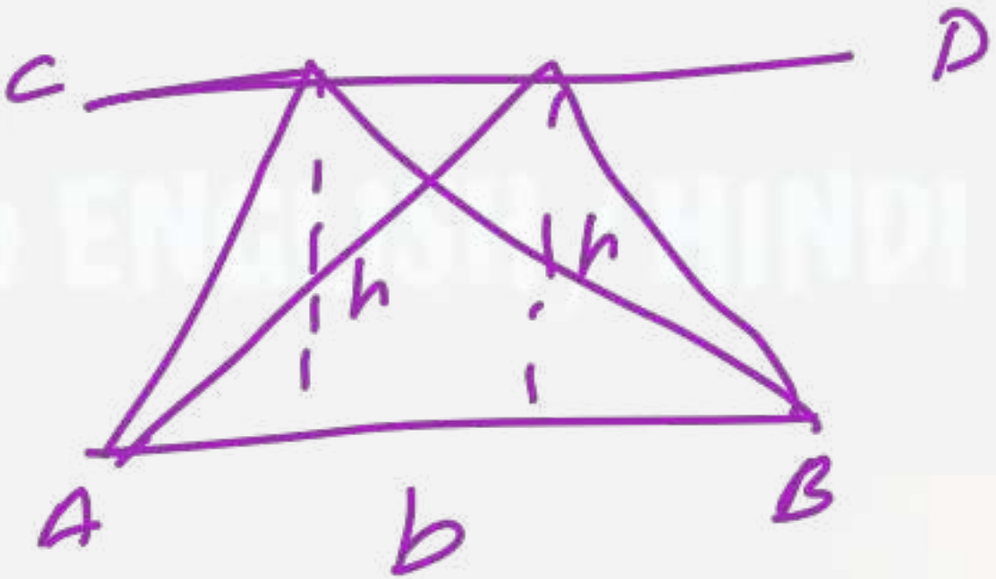
$= 27\ cm^2$

Let ΔABC and ΔABD be on the same base AB and between the same parallels AB and CD. Then the relation between areas of ΔABC and ΔABD will be:

✗ 1. $\text{Area}(\Delta ABC) = \frac{1}{2}\ \text{Area}(\Delta ABD)$

✓ 2. $\text{Area}(\Delta ABC) = \text{Area}(\Delta ABD)$

✗ 3. $\text{Area}(\Delta ABD) = \frac{1}{3}\ \text{Area}(\Delta ABC)$



✗ 4. $\text{Area}(\Delta ABD) = \frac{1}{2}\ \text{Area}(\Delta ABC)$

$\text{Area}_1 = \frac{1}{2} b \times h$

$\text{Area}_2 = \frac{1}{2} \times b \times h$

The diameter of a wheel is 70 cm. It completes 600 revolutions in 1 minute. The speed, in km/h, of the vehicle is:
(Take $\pi = \frac{22}{7}$)

1. 78.4
2. 79.2 ✓
3. 77.8
4. 78.2

KM H.M Deca.M M Deci.M CM MM
1 10 100 1000 10,000 100000

Perimeter: $2\pi r$ $\quad r = \frac{70}{2}$

$= 2 \times \frac{22}{7} \times \frac{70}{2}$ $\quad 10$

$= \frac{220 \times 600 \times 60}{100000}$ km/hr

$= \frac{22 \times 36}{10}$

$= \frac{792}{10}$ km/hr $= 79.2$

1 min = 600 rev
60 min = 600 x 60 rev
1 hr
Distance = P x No of Rev

$\frac{36}{22}$ 1
$\frac{72}{}$
$\frac{72}{792}$

A wire, in the form of a circle, encloses an area 3118.5 cm^2. It is now bent to form a rectangle whose length and breadth are very nearly in the ratio 7 : 4. The length of the rectangle, in cm, is:

(Take $\pi = \frac{22}{7}$)

1. 56
2. 49
3. 70
4. 63 ✓

$\pi r^2 = 3118.5$

$r^2 = \frac{3118.5}{10} \times \frac{7}{22}$

$r = \sqrt{\frac{567 \times 7}{2 \times 2}} = \sqrt{\frac{81 \times 7 \times 7}{2 \times 2}}$

$r = \frac{9 \times 7}{2}$

$2\pi r = 2(l + b)$

$\frac{22}{7} \times \frac{9 \times 7}{2} = 7x + 4x$

$11 \times 9 = 11x$

$x = 9$

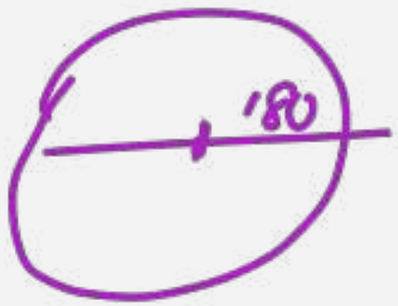
$7x = 7 \times 9 = 63$

How many balls of radius 45 cm can be made by melting a bigger ball of diameter 360 cm?

1. 64 ✓
2. 128 ✗
3. 32 ✗

$x \times \frac{4}{3}\pi r^3 = \frac{4}{3}\pi R^3$

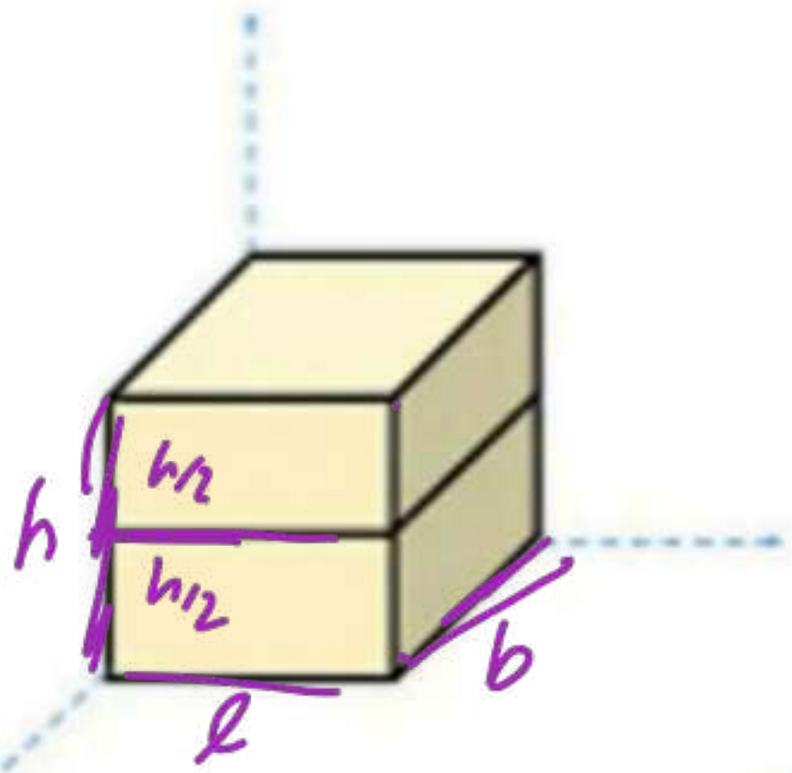
$x = \frac{R^3}{r^3} = \frac{180 \times 180 \times 180}{45 \times 45 \times 45}$

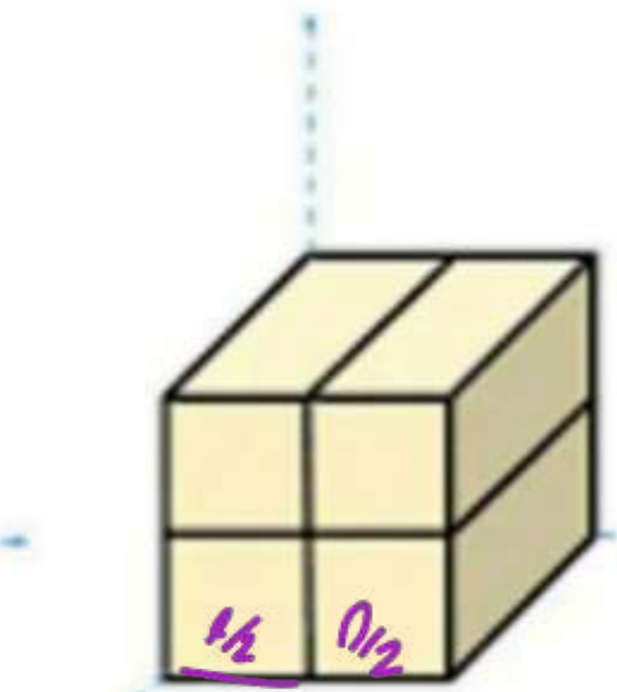


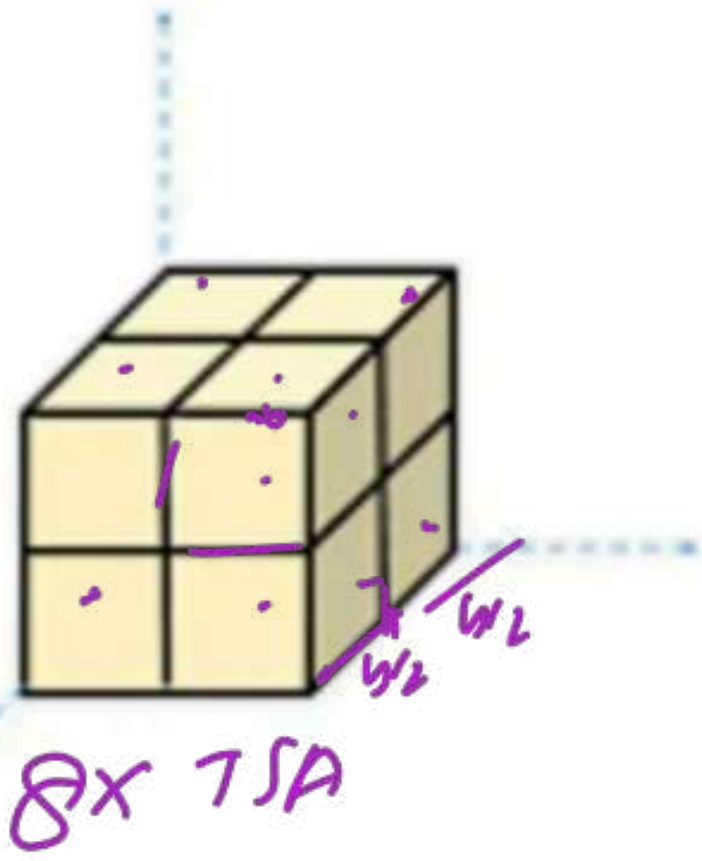
$R = 180$

$r = 45$

$x = 64$


h
h/2
h/2
b
l


l/2
b/2


h/2
h/2
h/2
8x TSA


h/2
b/2
h/2

A cuboid of size 100 cm × 80 cm × 60 cm cut into eight identical parts by three cuts. What is the total surface area (in square cm.) of all the eight parts?

1. 22500
2. 84100
3. 50750
4. 75200

$l = 50$ cm $b = 40$ cm, $h = 30$ cm

TSA $= 8 \times 2(lb + bh + hl)$

$= 8 \times 2(2000 + 1200 + 1500)$

$= 16 \times 47 \times 100$

$= 75200$

How many cubes with a side 10 cm can be cut out of a cube having a side of 10 metre?

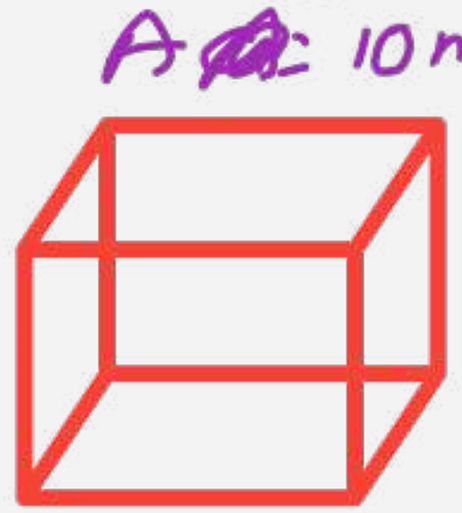
1. 10,000
2. 1,00,00,000
3. 1,00,000
4. 10,00,000

$A^3 = x \times a^3$

$x = \frac{A^3}{a^3}$

$x = \frac{100 \times 1000 \times 1000}{10 \times 10 \times 10}$

$x = 10,00,000$



100 cm = 1m

A = 10 x 100 m

A = 1000 m

What is the volume of the sphere whose diameter is 42 cm?

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

D = 42 cm
r = 21 cm

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

$V = \frac{4}{3} \times \frac{22}{7} \times 21 \times 21 \times 21$

8 8 8

1. $9702\ \text{cm}^3$
2. $38808\ \text{cm}^3$
3. $19404\ \text{cm}^3$

The length and the breadth of a rectangle are 15 cm and 12 cm respectively. If the rectangle is given one full rotation about its breadth as the axis, what is the volume (in cm^3) through which the rectangle moves?

1. $2160\ \pi$
2. $1440\ \pi$
3. $1800\ \pi$
4. $2700\ \pi$ ✓

$V = \pi r^2 h$

$V = \pi \times 15^2 \times 12$

$= \pi \times 225 \times 12$

$= 2700\pi$

225
× 12
450
225
2700

A spherical ball of diameter 35 cm rolls 20 times. How much is the distance (in m) covered by it?

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

35 cm - 20 times

1. 22 ✓
2. 20 ✗
3. 35 ✗
4. 44 ✗

Perimeter: $2\pi r$

Distance $= \pi D \times 20$

$= \frac{22}{7} \times \frac{5}{35} \times 20$

$= 110 \times 20$

$= 22 \times 100$ cm

$= 22$ m

$\frac{\text{cm}}{100}$ m

100 cm 1m

The length and the breadth of a cuboid are increased by 10% each, whereas the height is reduced by 10%. By how much did the volume change?

1. 10% decrease
2. 8.9% increase ✓
3. 8.9% decrease
4. 10% increase

$l \; \frac{100}{110}$ $b \; \frac{100}{110}$ $h \; \frac{100}{90}$

$V = lbh$

$\frac{V_1}{V_2} = \frac{100}{110} \times \frac{100}{110} \times \frac{100}{90}$ $\quad \frac{121}{89} \; 1$

$= \frac{1000}{1089}$

$= \frac{100}{1089}) 8.9\%$

$\frac{89}{1000} \times 100$

The volume of a sphere is 36π cm^3 . What is the radius of the sphere?

1. 4 cm
2. 2 cm
3. 5 cm
4. 3 cm ✓

$V = \frac{4}{3}\pi r^3 = 36\pi$

$r^3 = \frac{36 \times 3}{4}$

$r^3 = 27 = 3^3$

$r = 3$ cm

What are respectively the curved surface area and volume of a hemisphere of radius 21 cm?

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

1. $2772\ \text{cm}^2$, $19404\ \text{cm}^3$

2. ~~$4158\ \text{cm}^2$, $19404\ \text{cm}^3$~~

3. $2772\ \text{cm}^2$, $4158\ \text{cm}^3$

4. $2772\ \text{cm}^2$, $9702\ \text{cm}^3$

CSA $= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 21 \times 21$

$= 2772$

$V = \frac{2}{3}\pi r^3$

$= \frac{2}{3} \times \frac{22}{7} \times 21 \times 21 \times 21$

$= 19404$

The radius of a solid right circular cylinder is $66\frac{2}{3}$ % of its height. If height is h centimetres then its total surface area (in cm^2) is:

1. $\frac{20}{9}\pi h^2$
2. $\frac{40}{9}\pi h^2$
3. $\frac{44}{9}\pi h^2$
4. $4\pi h^2$

TSA $= 2\pi r(h+r)$ $\quad r = 66\frac{2}{3}\% \text{ of } h$

$= 2\pi \frac{2}{3}h\left(h+\frac{2}{3}h\right)$ $\quad r = \frac{200}{3\times100}h$

$r = \frac{2}{3}h$

$= \frac{4\pi h}{3}\left(\frac{3h+2h}{3}\right)$

$= \frac{4\pi h}{3} \times \frac{5h}{3} = \frac{20}{9}\pi h^2$

1000 solid spherical balls each of radius 0.6 cm are melted and recast into a single spherical ball. What is the surface area (in cm^2) of ball so formed?

1. 144π
2. 128π
3. 124π
4. 108π

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

$1000 \times \frac{4}{3}\pi r^3 = \frac{4}{3}\pi R^3$

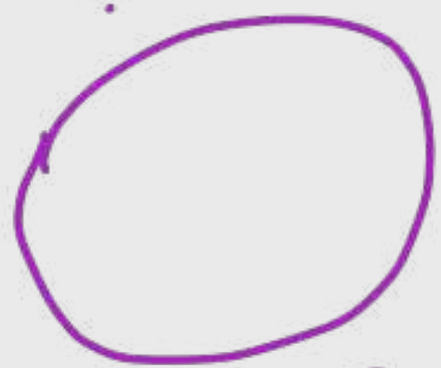
$R^3 = 1000 \times \frac{6}{10} \times \frac{6}{10} \times \frac{6}{10}$

$R^3 = 6^3$

$R = 6$ cm

00000

$r = 0.6\ cm = \frac{6}{10}$



$TSA = 4\pi R^2$

$= 4\pi \times 6 \times 6$

$= 144\pi$

The height of a cone is equal to its base radius and its volume is 72π cm^3. What is its curved surface area in cm^2 ?

1. $72\sqrt{2}\pi$
2. $36\sqrt{2}\pi$
3. $48\sqrt{2}\pi$
4. $54\sqrt{2}\pi$

$V = \frac{1}{3}\pi r^2 h = 72\pi$

$\frac{1}{3}\pi \times r^2 \times r = 72\pi$

$r^3 = 72 \times 3$

$r = \sqrt[3]{2^3 \times 3^3}$

$r = 2 \times 3 = 6$

$h = 6$

$\therefore l = \sqrt{h^2 + r^2} = \sqrt{36+36} = \sqrt{72}$

$= \sqrt{36 \times 2}$

$= 6\sqrt{2}$

$h = r$

CSA $= \pi r l$

$= \pi \times 6 \times \sqrt{72}$

$= \pi \times 6 \times \sqrt{36 \times 2}$

$= \pi \times 6 \times 6\sqrt{2}$

$= 36\sqrt{2}\pi$

$x \times 2 = 72$

$x = \frac{72}{2} = 36$

$72 = 2^3 \times 3^2$

A copper wire of radius 0.5 mm and length $42\frac{2}{3}$ m is melted and converted into a sphere of radius R cm. What is the value of R?

1. 3
2. 2 ✓
3. 1.5
4. 1.8

0.5 mm = 0.5/10 cm

r = 0.05 cm

L: $42\frac{2}{3}$ = 128/3 m = 128/3 x 100 cm

M Decim CM MM
1 10 100 1000

R - cm

$V_{cyl} = V_{sph}$

$\pi r^2 h = \frac{4}{3}\pi R^3$

$R^3 = \frac{r^2 h}{4} \times 3 = \frac{0.05 \times 0.05 \times \frac{128}{3} \times 100 \times 3}{4}$

$R^3 = 0.05 \times 5 \times 32$

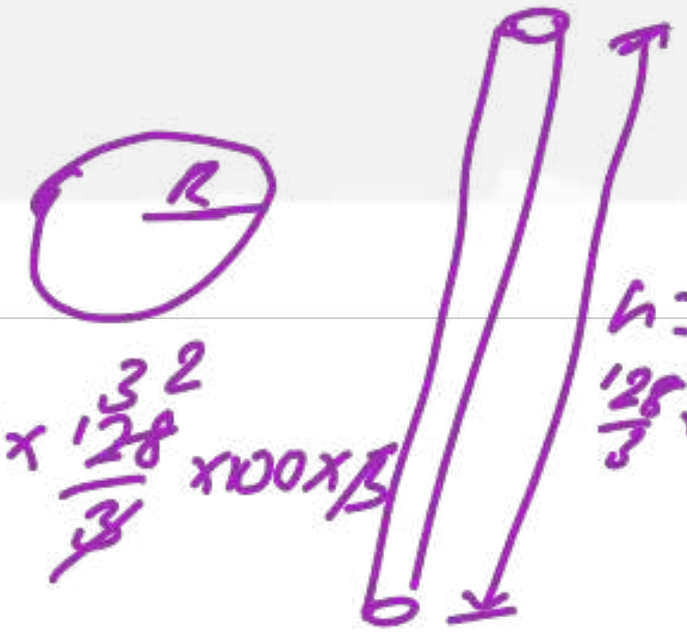
$R^3 = \frac{5}{100} \times 5 \times 8 \times 4$

$= \frac{5^2 \times 2^3 \times 2^2}{100} = \frac{5 \times 2}{5 \times 2}$

$R^3 = \frac{5^3 \times 2^3 \times 2^3}{10^3}$

$R = \frac{5 \times 2 \times 2}{10} = \frac{20}{10} = 2$

2 | 32
2 | 16
2 | 8
2 | 4
2 | 2
1



The diameter of the base of a right circular cone is 10 cm and its height is 12 cm. What is the total surface area (in cm^2) of the cone?

1. 90π
2. 70π
3. 84π
4. 65π

$r = 5$ $\quad h = 12$.

$TSA = \pi r l + \pi r^2$

$= \pi l (l + r)$

$= \pi \times 5 (13 + 5)$

$= \pi \times 5 \times 18$

$= 90\pi$

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

$l = \sqrt{25 + 144}$

$l = \sqrt{169} = 13$

The area of the base of a right circular cone is $\frac{1408}{7} cm^2$ and its height is 6 cm. Taking $\pi = \frac{22}{7}$, the curved surface area of the cone is ——.

1. $\frac{7160}{7} cm^2$

2. $\frac{1670}{7} cm^2$

3. $\frac{1760}{7} cm^2$

4. $\frac{1067}{7} cm^2$

$\pi r^2 = \frac{1408}{7}$

$h = 6$

$CSA = \pi r l$

$\frac{22}{7} r^2 = \frac{1408}{7}$

$r^2 = 64 = 8^2$

$r = 8$

$l = \sqrt{64 + 36} = 10$

$CSA = \frac{22}{7} \times 8 \times 10$

$= \frac{1760}{7} cm^2$

If the surface area of two spheres is in the ratio 49 : 25, then the ratio of their volumes will be:

1. 343 : 125
2. 64 : 27
3. 25 : 49
4. 343 : 64

$\frac{4\pi r_1^2}{4\pi r_2^2} = \frac{49}{25}$

$\left(\frac{r_1}{r_2}\right)^2 = \left(\frac{7}{5}\right)^2$

$\frac{r_1}{r_2} = \frac{7}{5}$

$\frac{r_1^3}{r_2^3} = \frac{343}{125}$

$\frac{V_1}{V_2} = \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3}$

If the area of the base of a cone is increased then it becomes 1.96 times of original area. If the volume is increased by:

1. 40%
2. 96%
3. 141%
4. 100%

$\frac{V_1}{V_2} = \frac{1}{1.96}$

$= \frac{100}{104}$ ↑ 96%

1 : 1.96

πr^2

πr^2

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

The base area of a cuboid is 34 sq cm. and height is 3.5 cm. What is the volume of cuboid?

1. $125\ cm^3$
2. $97\ cm^3$
3. $119\ cm^3$
4. $108\ cm^3$

lxb

h

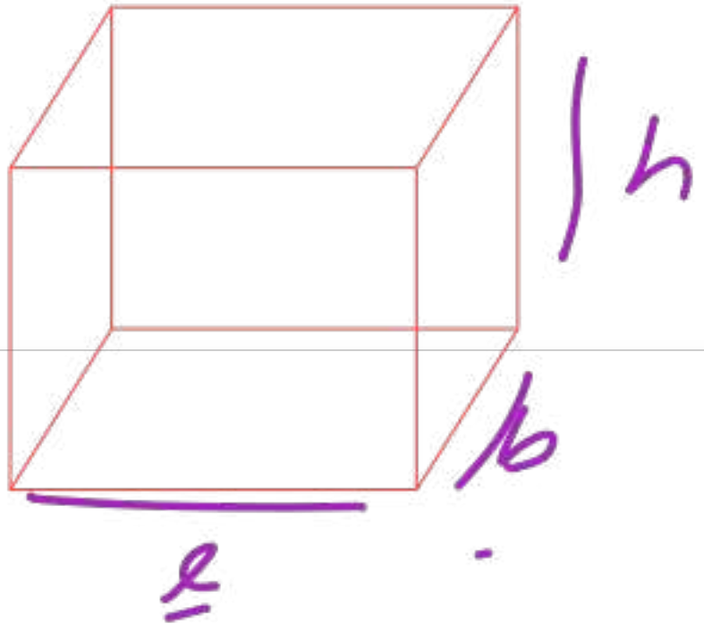
l . b h

V = lbh

V = 34 x 3.5

= 119 cm³

34
35
170
102
119.0



Find the total surface area of a cube whose volume is 64 cm^3.

1. 84 cm^2
2. 64 cm^2
3. 16 cm^2
4. 96 cm^2

Side - a

TSA : $6a^2$

V : $a^3 = 64$

$a^3 = 4^3$

$a = 4$

TSA : 6×16

$= 96$

Height of a right circular cone is 28 cm. If diameter of its base is 42 cm, then what will be the curved surface area of the cone?

1. $4620\ cm^2$
2. $170\ cm^2$
3. $2310\ cm^2$
4. $1540\ cm^2$

D: 42 cm

r: 21 cm

h: 28 cm

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

$l = \sqrt{441+784}$

$= \sqrt{1225} = \sqrt{35^2}$

$l = 35$

CSA $= \pi r l$

$= \frac{22}{7} \times 21 \times 35$

$= 66 \times 35$

$= 2310 cm^2$

66
35
330
198
2310

The volume of a right circular cone is equal to the volume of that right circular cylinder whose height is 48 cm and diameter of its base is 20 cm. If the height of the cone is 16 cm, then what will be the diameter of its base?

1. 45 cm
2. 130 cm
3. 25 cm
4. 60 cm ✓

H = 48cm
D = 20 , R = 10 cm
h = 16cm r = ?

$V_{co} = V_{cy}$ (cms)

$\frac{1}{3}\pi r^2 h = \pi R^2 H$

$r^2 = \frac{10 \times 10 \times 48 \times 3}{16}$

$r = 10 \times 3 = 30$

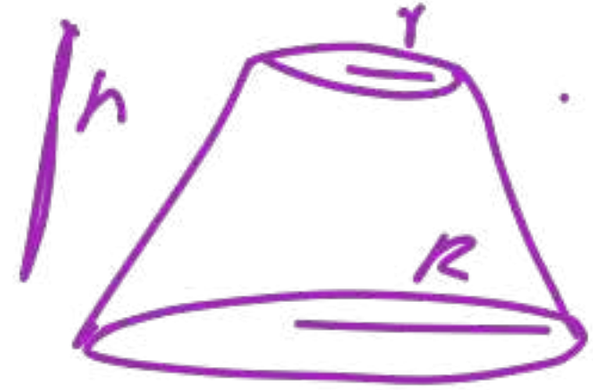
$d = 30 \times 2 = 60$ cm

The volume of a frustum of a cone with radii 8 cm and 10 cm and height is 21 cm is: (Take: $\pi = \frac{22}{7}$)

1. 5368 cm^3
2. 4328 cm^3
3. 6112 cm^3
4. 4816 cm^3

$R = 10\,cm \quad r = 8\,cm$

$h = 21\,cm$



$V = \frac{1}{3}\pi(R^2 + r^2 + Rr).h$

$V = \frac{1}{3} \times \frac{22}{7} \times (10^2 + 8^2 + 10 \times 8) \times 21$

$= 22 \times (100 + 64 + 80)$

$= 22 \times 244$

$= 5368\,cm^3$

(3)

$$\begin{array}{r} 244 \\ \times\ 22 \\ \hline 488 \\ 488 \\ \hline 5368 \end{array}$$

A reservoir is in the shape of a frustum of a right circular cone. The radii of its circular ends are 4 m and 8 m and its depth is 7 m. How many kilolitre of water (correct up to one decimal place) can it hold?

(Take $\pi = \frac{22}{7}$)

1. 821.3
2. 815.7
3. 792.3
4. 775.7

$V = \frac{1}{3}\pi(R^2 + r^2 + Rr)h$ m³

$= \frac{1}{3} \times \frac{22}{7} \times (64 + 16 + 32) \times 7$

$= \frac{1}{3} \times 22 \times 112$

$= 37.33$

$1 L = 1000 cm^3$

$1000 cm^3 = 1000 \times \frac{1}{100} \times \frac{1}{100} \times \frac{1}{100} m^3$

$100 cm = 1 m$

$1 cm = \frac{1}{100} m$

$1 cm^3 = \frac{1}{100} \times \frac{1}{100} \times \frac{1}{100} m^3$

$1 L = \frac{1}{1000} m^3$

$1 kL = \frac{1}{1000} \times 1000 m^3$

3

The capacity of a cylindrical tank is 246.4 litres. If the height is 4 metres, what is the diameter of the base? (Use $\pi \frac{22}{7}$)

1. 0.14 metres
2. 2.8 metres
3. 0.28 metres
4. 1.4 metres

$\frac{22}{7} \times 4 \cdot 1^2 = \frac{246.4}{1000}$

$\frac{112}{2464} \quad \frac{7}{1}$

$\frac{4}{22}$

$\therefore \frac{4 \cdot 1^2}{2 \times 100 \times 4} = \frac{16.72}{1600 \cdot 1}$

0.28

A wire encloses an area of 616 cm^2 when it is bent in the form of a circle. If the wire is bent in the form of a square, then its area (in cm^2) is very nearly equal to: $\left(\text{Take } \pi = \frac{22}{7}\right)$

1. 400
2. 576
3. 441
4. 484

$A = 616\ cm^2$ $\quad A = ?$

$2\pi r = 40$

$a = \frac{2\pi r}{2} = \frac{\pi r}{2}$

$\text{Area}_C = \pi r^2 = 616$

$r^2 = \frac{616 \times 7}{22}$

$r = \sqrt{\frac{28 \times 7}{2}} = \sqrt{4 \times 7 \times 7} = 2 \times 7 = 14$

$a = \frac{22}{7} \times \frac{14}{2} = 22$

$A_S = a^2 = 22^2 = 484$

The areas of two squares are 16:9. The ratio of their perimeter is:

1. 9:16
2. 12:16
3. 9:12
4. 16:12 ✓

$A = a^2$

$P : a$

$\frac{A_1}{A_2} = \frac{16}{9} = \frac{a_1^2}{a_2^2}$

$\frac{a_1}{a_2} = \sqrt{\frac{16}{9}} = \frac{4}{3}$

$\frac{P_1}{P_2} = \frac{4a_1}{4a_2} = \frac{4 \times 4}{4 \times 3} : \frac{16}{12}$

4/3

The Area of a rectangle is $27\ m^2$ and its length is 3 times of its breadth. The perimeter of the rectangle is:

1. 28cm
2. 12cm
3. 24cm
4. 42cm

l b

$3x$ x

$l \times b = 27$

$3x \times x = 27$

$x^2 = 9$

$x = 3$

$P = 2(l+b)$

$= 2(3x+x)$

$= 2 \times 4x$

$= 2 \times 4 \times 3 = 24\ m$

A wheel makes 4000 revolution in covering a distance of 60km. The radius of the wheel is:

1. 4.68m
2. 2.39 m ✓
3. 8m
4. 8.25m

Rev → Dist

4000 → 60 × 1000 M

1 ⇒ 60 M

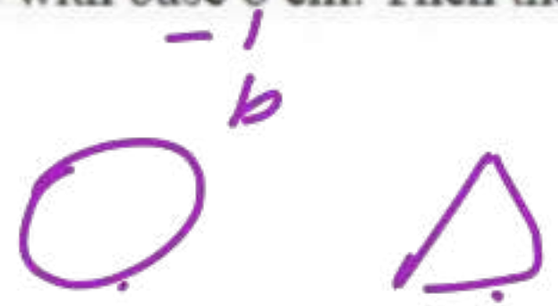
1 ⇒ 15 M

$2\pi r = 15$

$r = \frac{15}{2\pi} = \frac{15}{2} \times \frac{7}{22} = \frac{105}{44}$ $2\frac{3}{2}$

A circle with radius 8 cm which has the area equal to the area of triangle with base 8 cm. Then the length of the corresponding altitude of triangle is _____.

1. $38\ \pi$ cm
2. $18\ \pi$ cm
3. $8\ \pi$ cm
4. $16\ \pi$ cm ✓



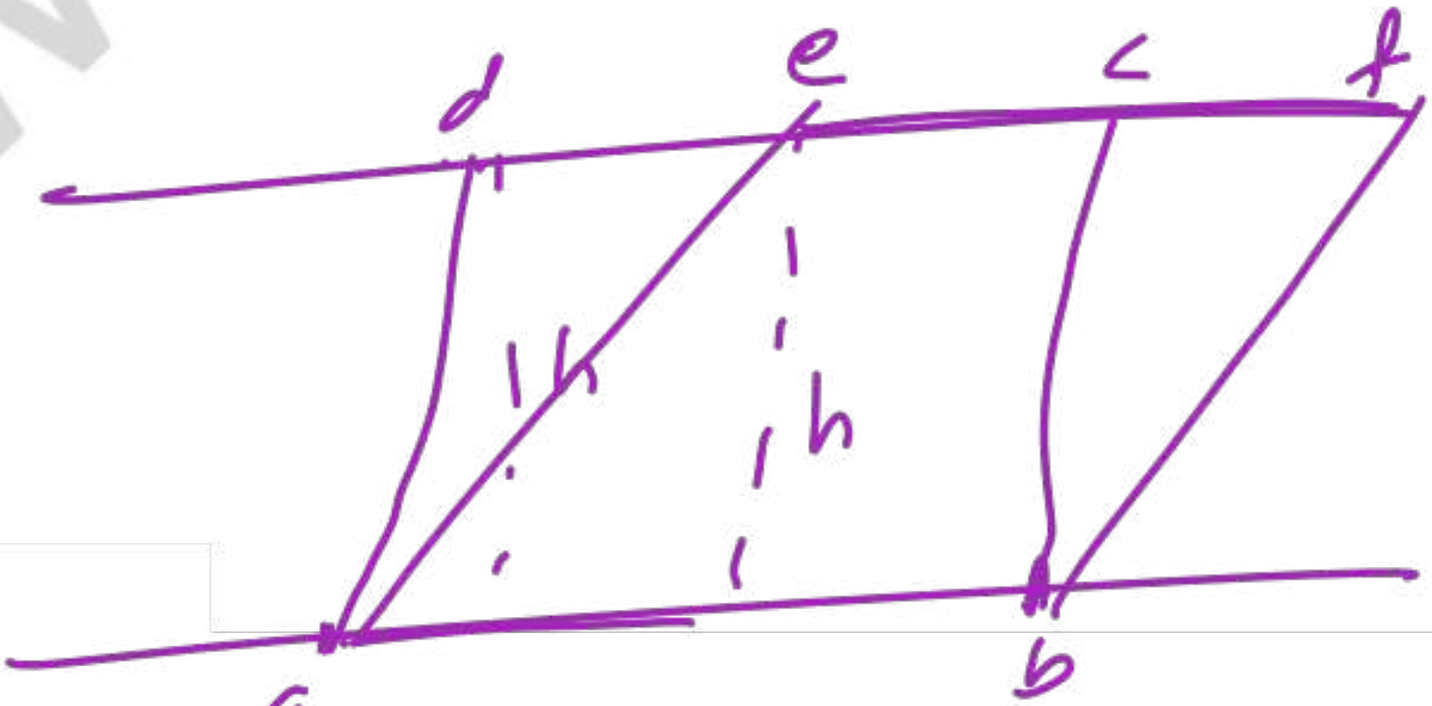
$\pi r^2 = \frac{1}{2} \times b \times h$

$\pi \times 8 \times 8 = \frac{1}{2} \times 8 \times h$

$h = 16\pi$

Two parallelogram stand on equal bases and between the same parallel. The ratio of their areas is:

1. 1 : 3
2. 2 : 1
3. 1 : 1
4. 1 : 2



A = b×h : b×h

1 : 1

abcd abef

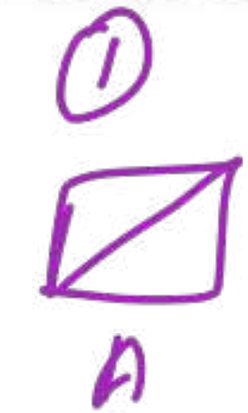
The diagonal of a square A is (a + b). The diagonal of a square whose area is twice the area of square A is

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

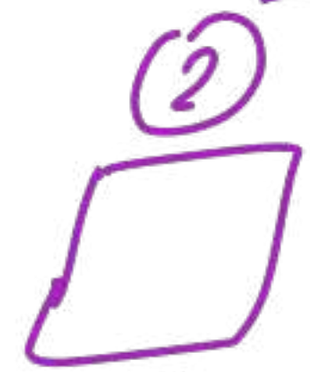
$A_1 = \frac{d^2}{2}$

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

$A_2 = 2 \times \frac{(a+b)^2}{2}$



$d = a+b$



d_2

$A_2 = \frac{d_2^2}{2}$

$\frac{d_2^2}{2} = (a+b)^2 \Rightarrow d_2^2 = \sqrt{2}(a+b)^2$

$= (a+b)\,r_2$

The circumference of a given circle is 176 cm. What is the approximate diagonal of a square whose side is half of the radius of a given circle?

✗ 1. ~~15 cm~~

✗ 2. 24 cm

✗ 3. 12 cm

✓ 4. 20 cm

$2\pi r = 176$

168

$r = \frac{176}{2} \times \frac{7}{22} = 28$

$a = \frac{28}{2} = 14$

$P = 176$

$a = r/2$

$d = 20$

$d = \sqrt{2} \times 14$

$\sqrt{2} = 1.414$

$d = 1.414 \times 14$

$$\begin{array}{r} 141 \\ \times\ 14 \\ \hline 564 \\ 141 \\ \hline 19.74 \sim 20 \end{array}$$

If the length of a rectangle is increased in the ratio 4 : 5 and its breadth is decreased in the ratio 3 : 2, then its area will be decreased in the ratio _____

1. 2 : 1
2. 4 : 3
3. 10 : 3
4. 6 : 5

$A = l\,b$

$\frac{x}{y} = \frac{4}{5} \times \frac{3}{2} = \frac{6}{5}$ $\quad 6 : 5$

The length and breadth of a painting is 15 cm and 10 cm respectively. A 1 cm wide boarder is made around the painting. What is the area of boarder?

✗ 1. 45 sq cm.

✗ 2. 60 sq cm.

✓ 3. 54 sq cm.

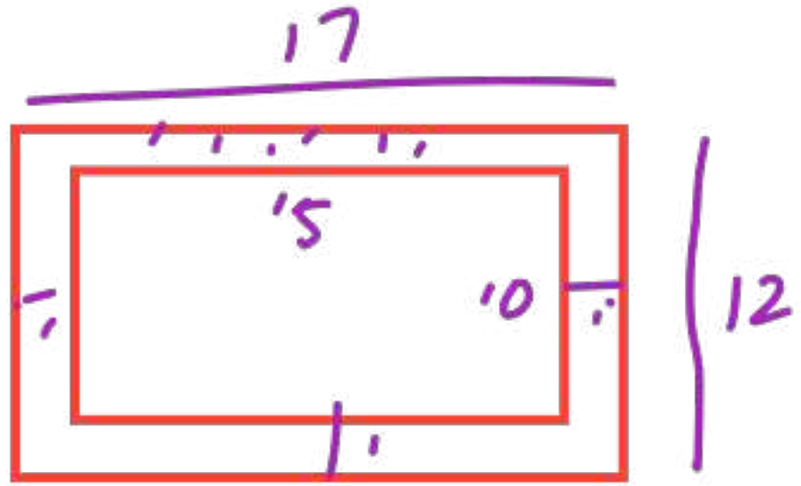
✗ 4. 16 sq cm.

l x b

= 17x12 - 15x10

= 204 - 150

= 54 cm²



What is the perpendicular distance (in cm) between the parallel sides of a trapezium whose area is 108 sq cm. and the lengths of the parallel sides are 9 cm and 36 cm?

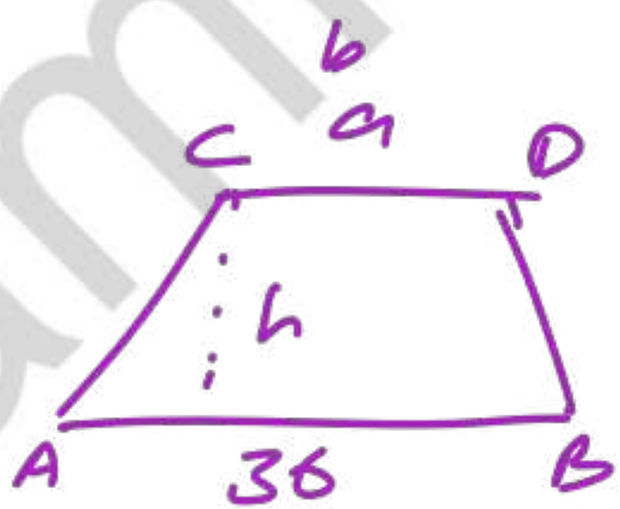
1. 7 cm
2. 3.6 cm
3. 6 cm
4. 4.8 cm

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

$108 = \frac{1}{2}(36+9) \times h$

$h = \frac{108 \times 2}{45} = \frac{216}{45}$

$4 \times 45 = 180$ $\quad$ $5 \times 45 = 225$



Area of a rhombus is 175 cm^2. Length of one diagonal is 25 cm. What is the length of other diagonal?

1. 12 cm
2. 14 cm
3. 10 cm
4. 15 cm

$A = \frac{d_1 \times d_2}{2}$

$175 = \frac{25 \times d_2}{2}$

$d_2 = 14$ cms

A rectangular field has length of 1200 m and breadth of 500 m. A road has to be made along its diagonal at the rate of ₹ 25 per m. What is the cost of making road?

1. ₹ 25600
2. ₹ 32500
3. ₹ 35000
4. ₹ 28400

$d = \sqrt{l^2 + b^2}$

$= \sqrt{1200^2 + 500^2}$

$= \sqrt{(100)^2(12^2 + 5^2)}$

$= 100\sqrt{144 + 25} = 100\sqrt{169} = 100 \times 13 = 1300\ m$

5×100

12×100

1 m ⇒ 25

1300 m ⇒ 25 × 1300

= 32500

250
× 75

32500

If the diameter of a circle increases by 15%, then what will be the percentage increase in its area?

1. 35.75%
2. 30.3%
3. 25%
4. 32.25%

$\frac{D}{2}\uparrow$ $r\uparrow$ $r = 15\%\uparrow$

$15\%\uparrow$ $r = \frac{20}{100}$

$r = \frac{115}{100} = \frac{23}{20}$

$A = \pi d^2$

$\frac{x}{y} = \frac{\pi}{\pi} \times \frac{23}{20} \times \frac{23}{20}$

32.25

$A \Rightarrow \frac{x}{y} = \frac{400}{529}$) 129 ↑

$\therefore \uparrow = \frac{129}{400} \times 100$

32.25%

The perimeter of a square and a circle are same. If the area of the circle is 1386 cm^2, then what will be the area of the square?

1. 1089 cm^2
2. 841 cm^2
3. 1024 cm^2
4. 1225 cm^2

$a^2 = ?$

$\pi r^2 = 1386$

$r^2 = 1386 \times \frac{7}{22}$

$r^2 = \sqrt{63 \times 7}$

$r = \sqrt{9 \times 7 \times 7} = 3 \times 7 = 21$

$4a = 2\pi r$

$a = 2 \times \frac{22}{7} \times \frac{21}{4}$

$a = 33\ cm$

$A = a^2$

$= 33 \times 33$

If the side of a square increases by 20%, then what will be percent increase in its perimeter?

1. 44%
2. 20%
3. 80%
4. 40%

$P = 4a$

$\frac{x}{y} = \frac{4}{4} \times \frac{100}{120} \rightarrow 20\%$

$\frac{20}{100} \times 100$

The sides of a triangle are in the ratio 5 : 2 : 1. If the perimeter of the triangle is 88 cm, then what will be the length of the largest side?

a : b : c

a : 5x b : 2x, c = x

1. 38 cm
2. 40 cm
3. 55 cm ✓
4. 44 cm

P = a + b + c

8x = 88

x = 11

5x = 55