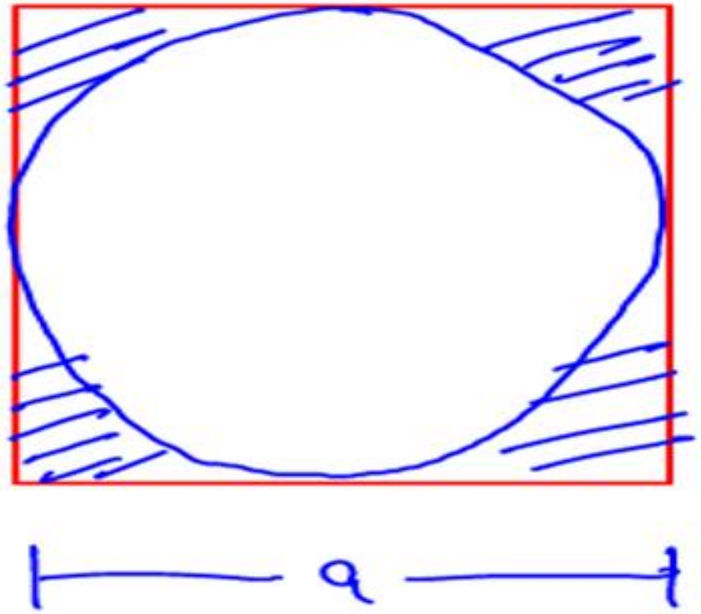
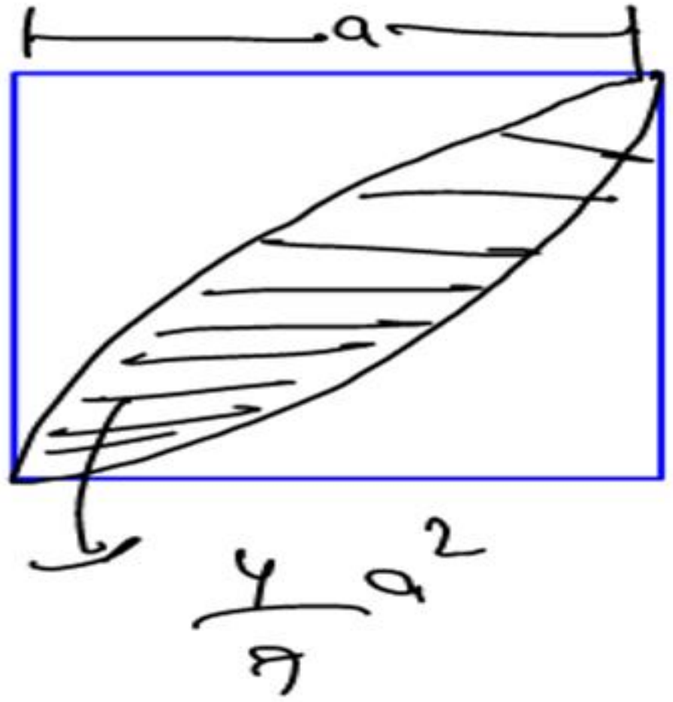
The Most Comprehensive
Preparation App For All Exams

MENSURATION-2D

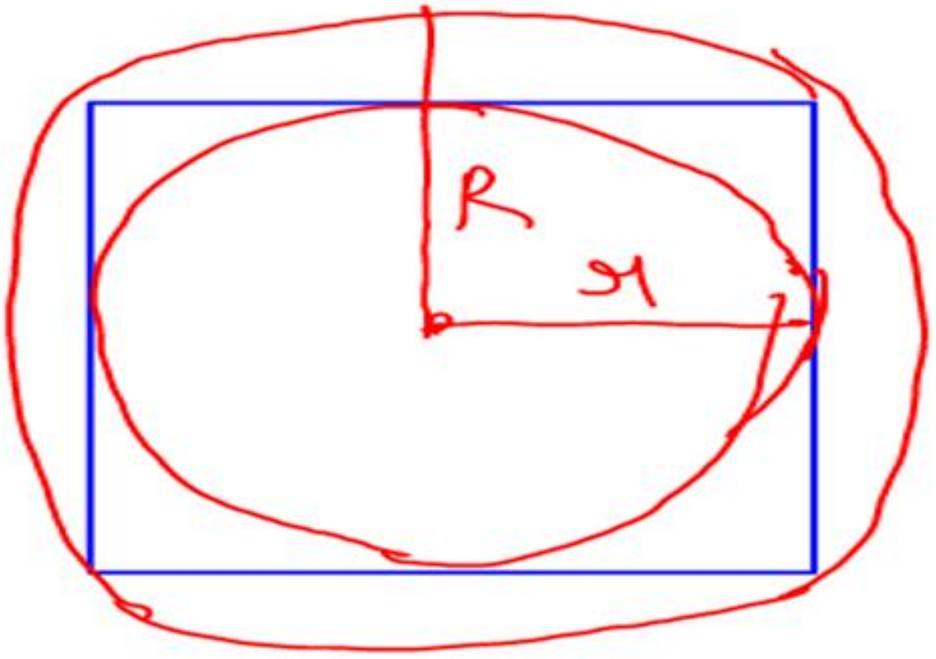
Part-5



Shaded Area $\Rightarrow \frac{3}{14} a^2$



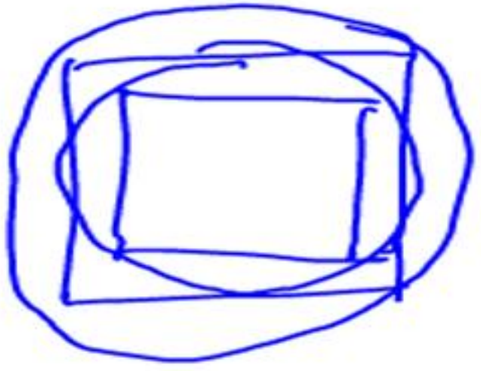
$\frac{4}{7} a^2$



$$r = \frac{\text{side}}{2}$$

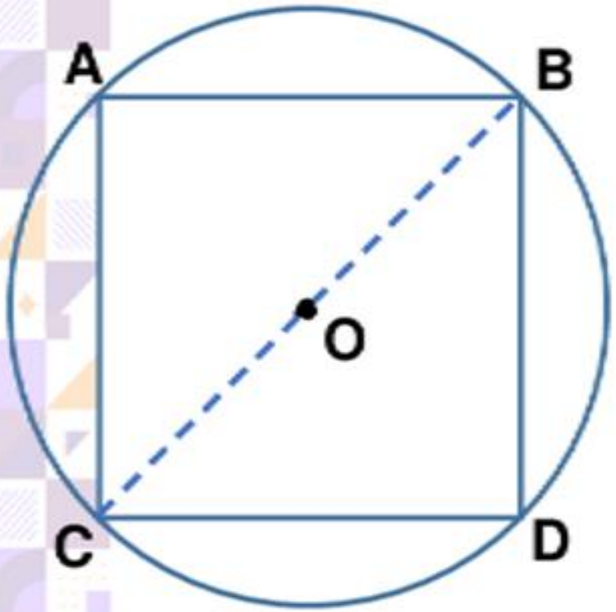
$$R = \frac{\text{side}}{\sqrt{2}}$$

$$\frac{r}{R} = \frac{1}{\sqrt{2}}$$



$$\frac{a}{A} = \frac{1}{\sqrt{2}}$$

SQUARE INSCRIBED IN A CIRCLE



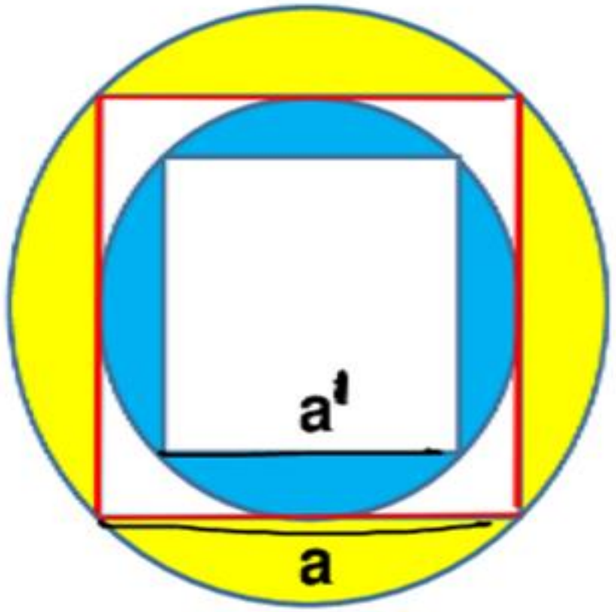
Diameter of circle = Diagonal of square

$2R = \sqrt{2}a$

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

Area of Circle = πR^2

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

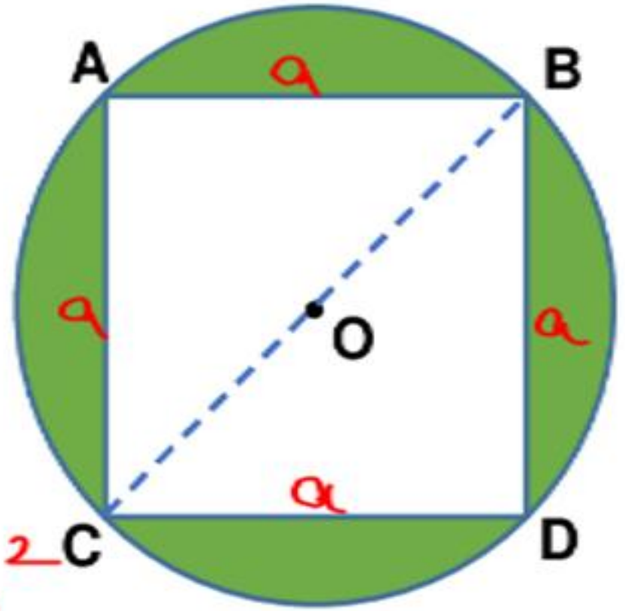


$$r = \frac{a}{2} \qquad R = \frac{a}{\sqrt{2}}$$

$$\frac{r}{R} = \frac{1}{\sqrt{2}}$$

$$\frac{a'}{a} = \frac{1}{\sqrt{2}}$$

Q5(i). Find the area of the largest square that can be drawn inside a circle of radius R.



$\sqrt{2}a = 2R$

$a = \sqrt{2}R$

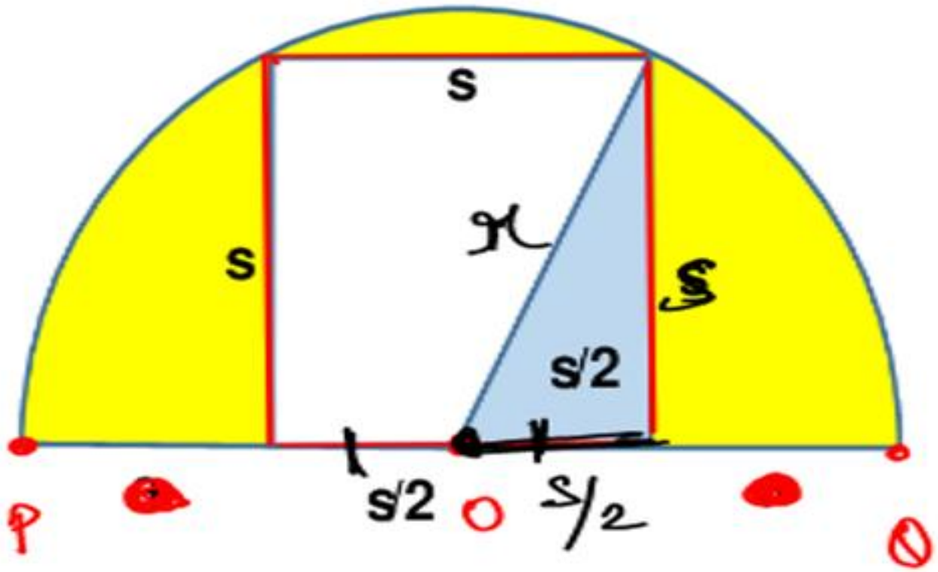
Area of square $= (\sqrt{2}R)^2$

$= 2R^2$

* Area of largest square drawn inside a circle of Radius R is $\boxed{2R^2}$

Ans. $2R^2$

Q5 (ii). Find the area of the largest square that can be drawn inside a semi-circle of radius r.



$$r^2 = s^2 + \left(\frac{s}{2}\right)^2$$

$$r^2 = s^2 + \frac{s^2}{4}$$

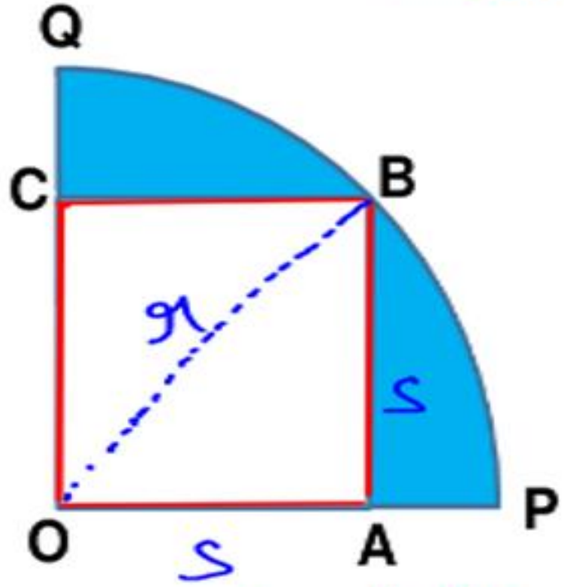
$$r^2 = \frac{5s^2}{4}$$

$$s^2 = \frac{4r^2}{5}$$

Area of largest square drawn inside a semi-circle of radius r is $\rightarrow \frac{4}{5}r^2$

Ans. $\frac{4}{5}r^2$

Q5 (iii). Find the area of the largest square that can be drawn inside a quadrant of radius r.

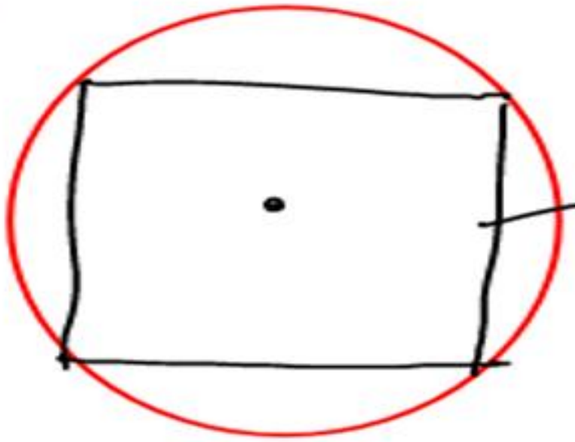


$$s^2 + s^2 = r^2$$

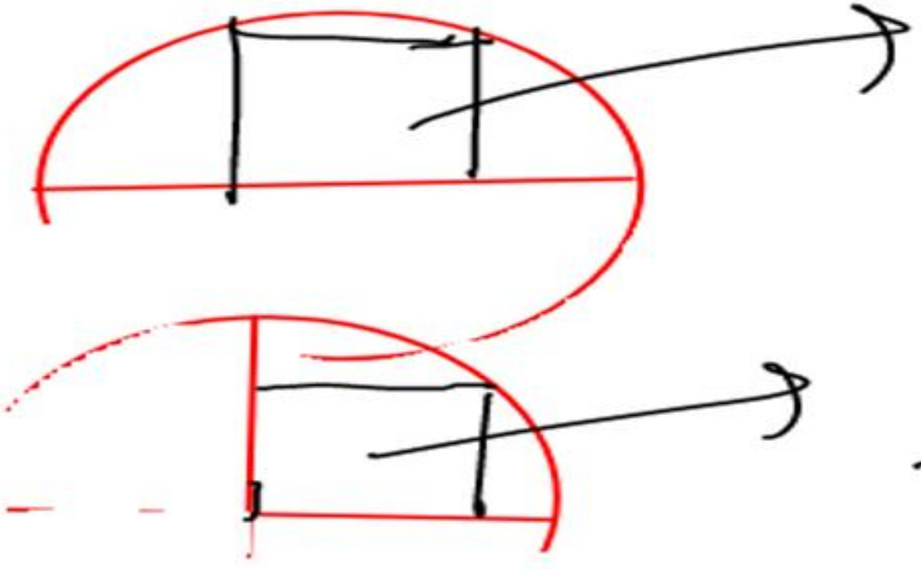
$$s^2 = \frac{r^2}{2}$$

Area of largest square drawn inside a quadrant of radius r is $\frac{r^2}{2}$

Ans. $\frac{r^2}{2}$



$2\pi r^2$



$4/5\pi r^2$

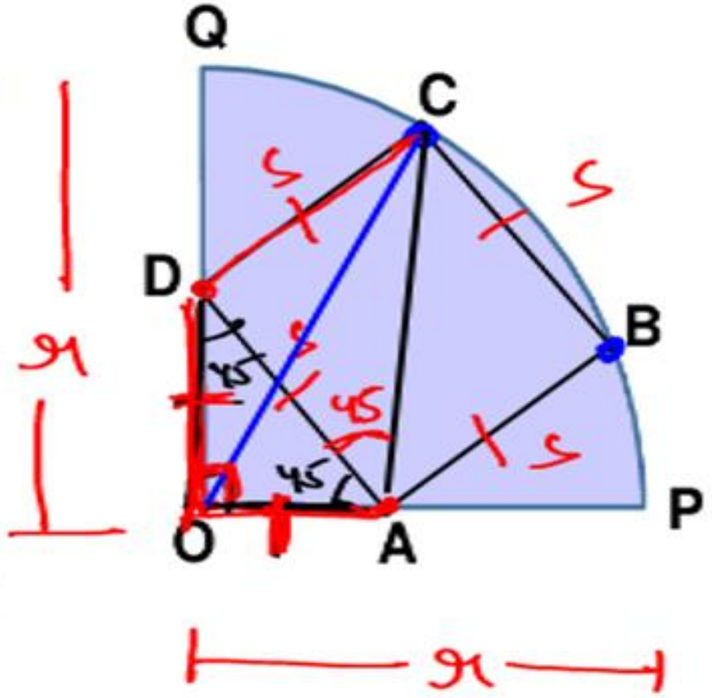
$\frac{\pi r^2}{2}$

V.V imp

Q6. A square is drawn inside a quadrant of radius r cm in such a way that 2 of its vertices are on the radii of the quadrant and they are at equal distance from the centre of circle and remaining 2 vertices are on the arc of the quadrant. Find the side of square in term of r.

PYQ SSC

2 Min



(i) $OA = OD = \frac{s}{\sqrt{2}}$

(ii) $\Delta OAC \rightarrow$ Right angle Δ

$(OC)^2 = (OA)^2 + (AC)^2$

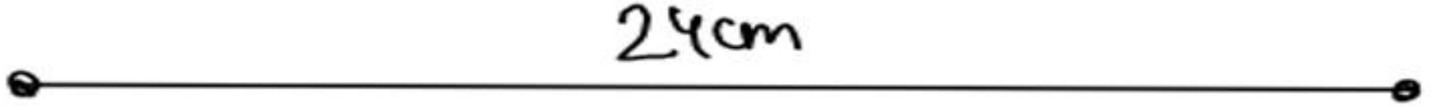
$r^2 = \frac{s^2}{2} + s^2$

$r^2 = \frac{3s^2}{2}$

$s = \sqrt{\frac{2}{3}}r$

Ans. $\frac{\sqrt{2}}{\sqrt{5}}r$

If perimeter of all regular polygon is a constant then the polygon which has more sides will have more area.



A Square

B Eq Δ

C Circle

D Regular Hexagon

Arrange the fig in ascending order of their Areas

B < A < D < C

If perimeter of all polygons of same number of sides is same then the regular polygon will have maximum area.

A Eq Δ

B Scalene Δ

C Isosceles Δ

Max Area → A

A Quad

B Parallelogram

C Rhombus

D Rectangle

E Trapezium

F Square

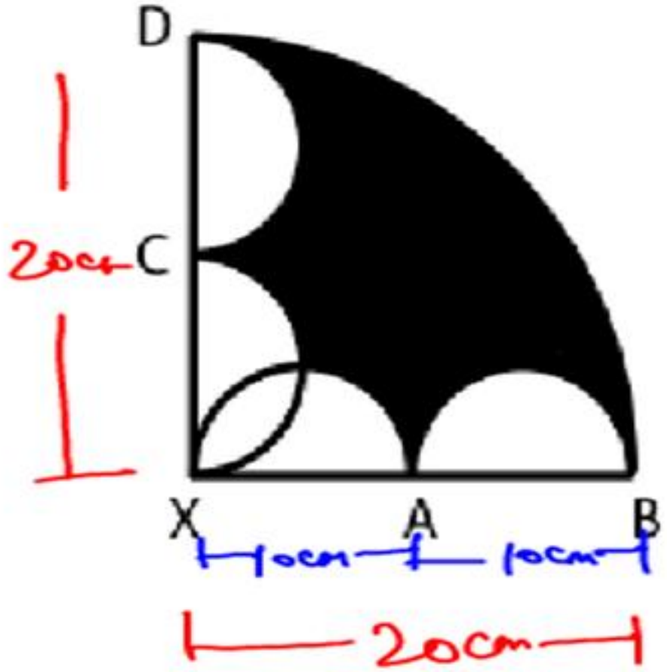
Maximum

V. Imp

Q7. XBD is quadrant of a circle where XB = 20 cm

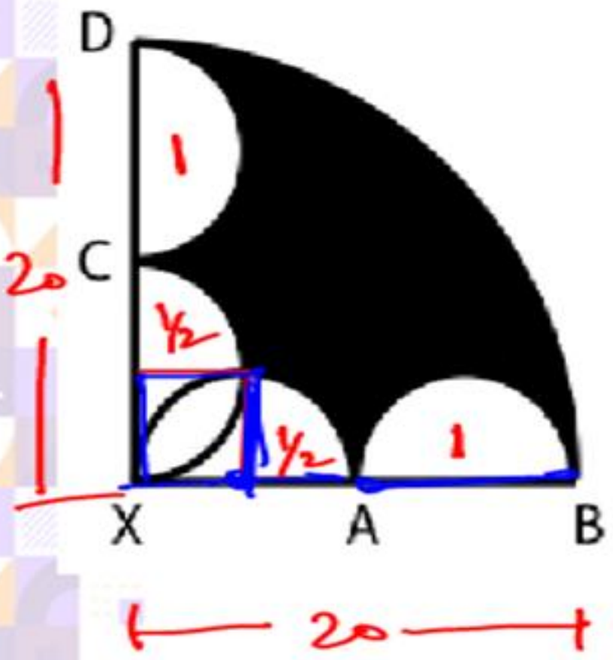
XA = AB = XC = CD

Four semi-circles are drawn taking XA , AB , XC and CD as diameter. Find the area of the shaded region.



Time → 2min

I^st



Unshaded Area

→ 3 Semi circles + Smaller Square

→ $3 \cdot \frac{11}{7} \cdot \frac{(5)^2}{2} + (5)^2$

→ $\frac{825}{7} + 25$ → $\frac{1000}{7}$ cm^2

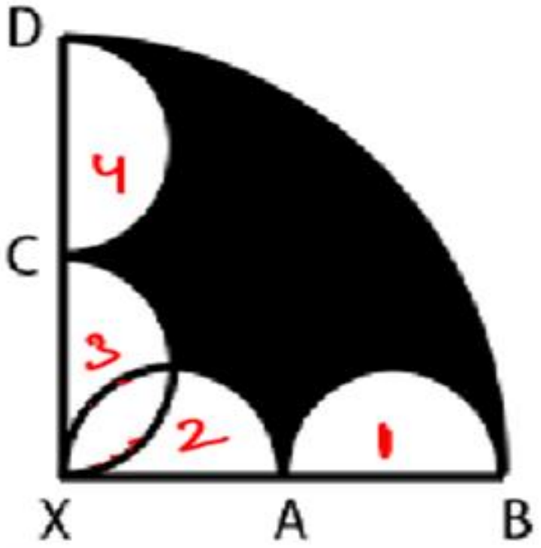
Area of shaded = Area of Quad − Unshaded

$\frac{22}{7} \cdot \frac{5}{2} \cdot \frac{20}{4} - \frac{1000}{7}$

→ $\frac{2200}{7} - \frac{1000}{7}$

$\frac{1200}{7}$ cm^2

IInd Approach



Unshaded Area

$= 4 \text{ Semi-circle} - \text{Leaf}$

$= 2 \cdot \frac{22}{7}(5)^2 - \frac{4}{7} \cdot 5^2$

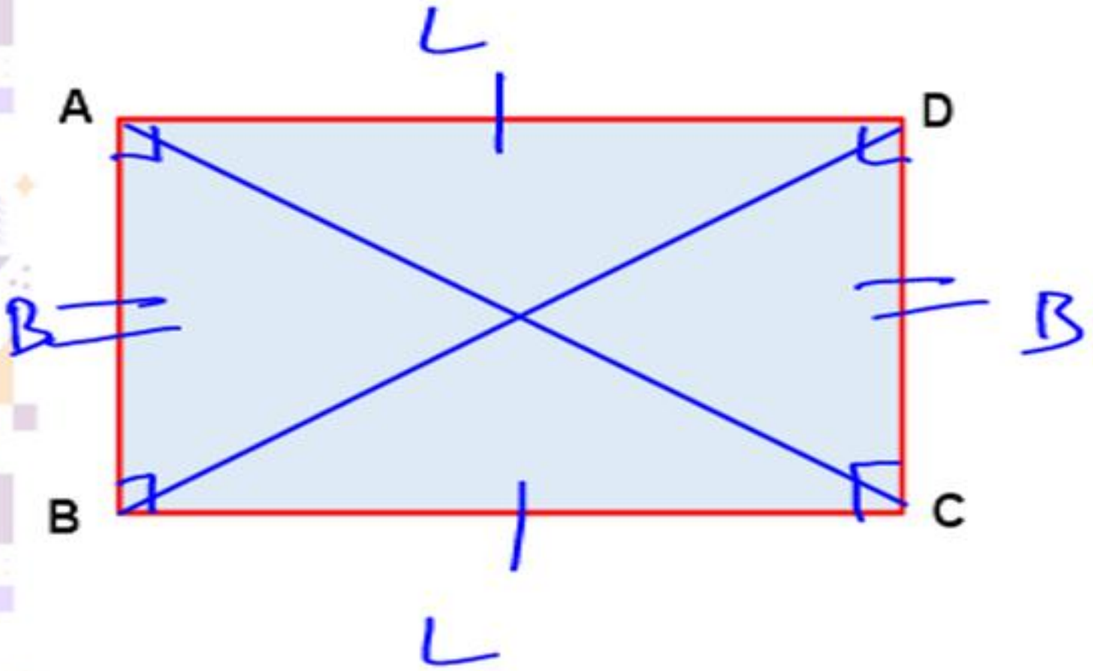
$\rightarrow \frac{1100}{7} - \frac{100}{7} = \frac{1000}{7} \text{ cm}^2$

Shaded Area = Area of Quad - Unshaded

$= \frac{2200}{7} - \frac{1000}{7}$

$= \frac{1200}{7} \text{ cm}^2$

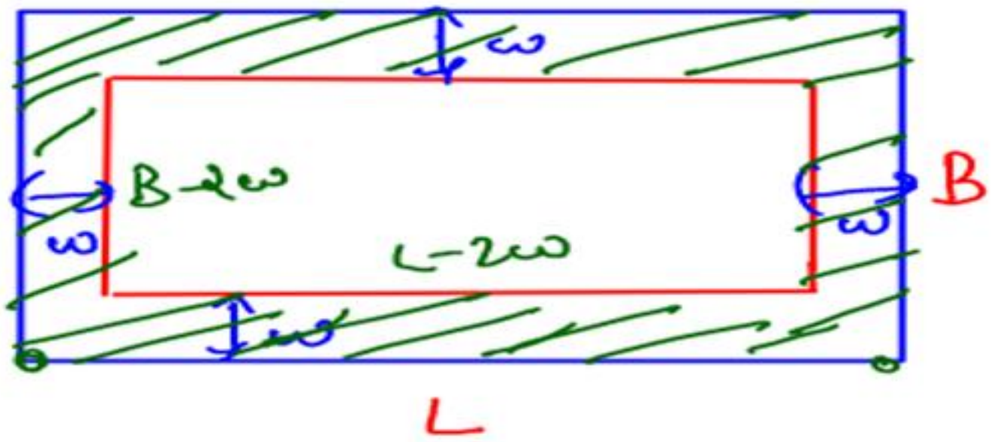
RECTANGLE



Perimeter = $2(L+B)$

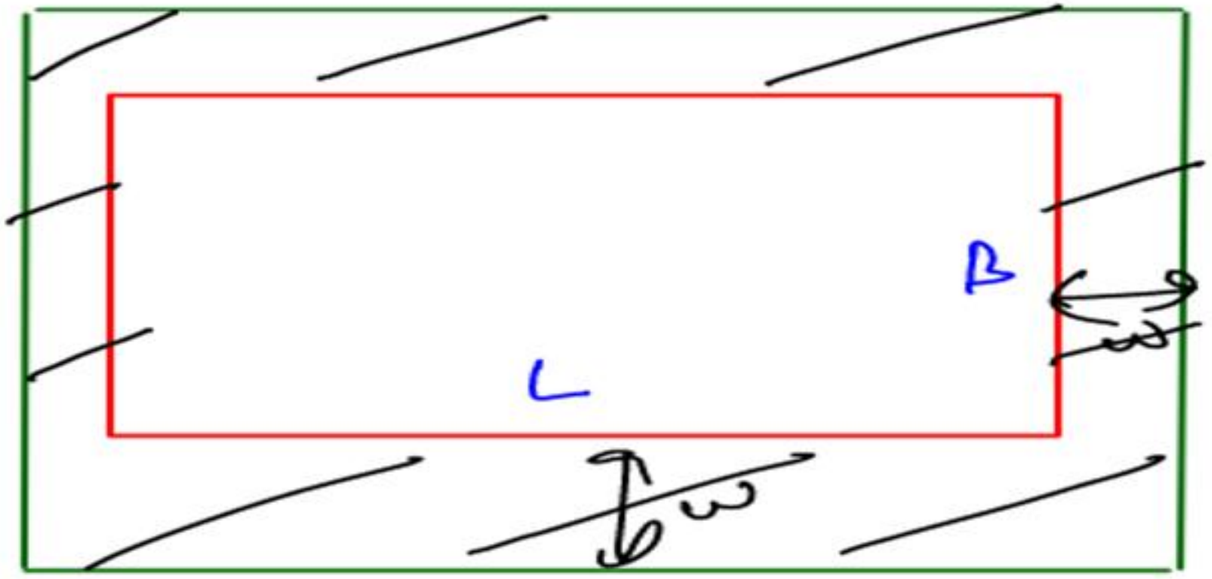
Area = $L \cdot B$

Diagonal = $\sqrt{L^2+B^2}$



$$\text{Area of Path} = (L \cdot B) - (L-2w)(B-2w)$$

$$= \boxed{2w(L+B-2w)}$$



Area of Path = $(2w)(L+B+2w)$

Q8. A path of uniform width runs round the inside of a rectangular field 38 m long and 32 m wide, If the path occupies 600 m^2, then the width of the path is

(a) 30 m (b) 5 m

(c) 18.75 m (d) 10 m

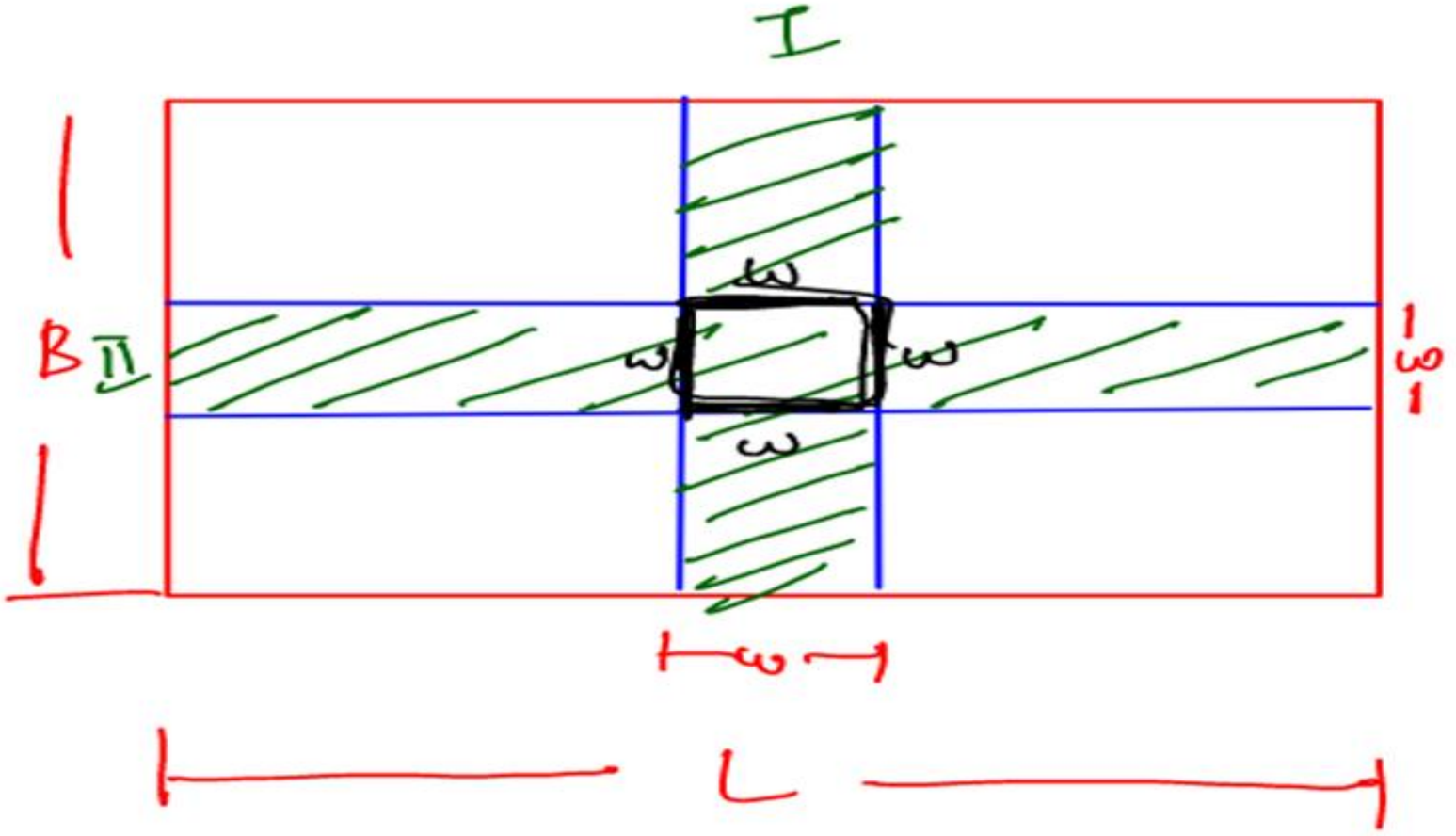
$$2w\,(L+B-2w) = 600$$

$$2w\,(38+32-2w) = 600$$

$$2w\,(70-2w) = 600$$

$$w\,(35-w) = 150$$

Ans. (b)



I → B · w

II → L · w

Common → w^2

Area of Roads

$= Lw + Bw - w^2$

$= w(L + B - w)$

Area of Road = $w(L + B - w)$

Q9. A rectangular park is 60 m long and 40 m wide. There are two paths in the middle of the plot parallel to its sides. The width of path is 4 meter. These paths cuts to each of the at right angle. Then find the cost of cementing the path at the rate of 7.50 Rs./ m^2?

(a) Rs. 25780
(b) Rs. 2880
(c) Rs. 2650
(d) Rs. 2000

$$w(L+B-w)$$

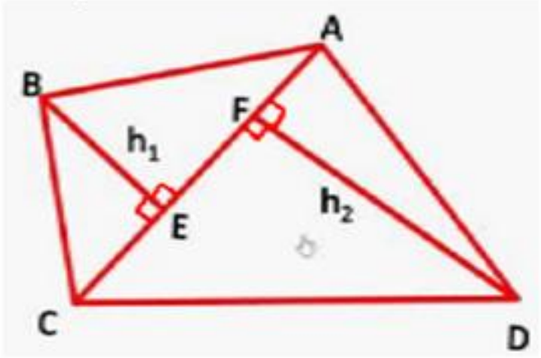
$$4(60+40-4) = 384\ m^2$$

$$384 \times \frac{75}{10} = 2880\ Rs$$

Ans. (b)

QUADRILATERAL

Area of quadrilateral ABCD :

(i) 

$$= \frac{1}{2} \times \textit{One of the diagonals} \times \textit{Sum of } \perp \textit{ dropped on it}$$

$$= \frac{1}{2} AC(BE + DF)$$

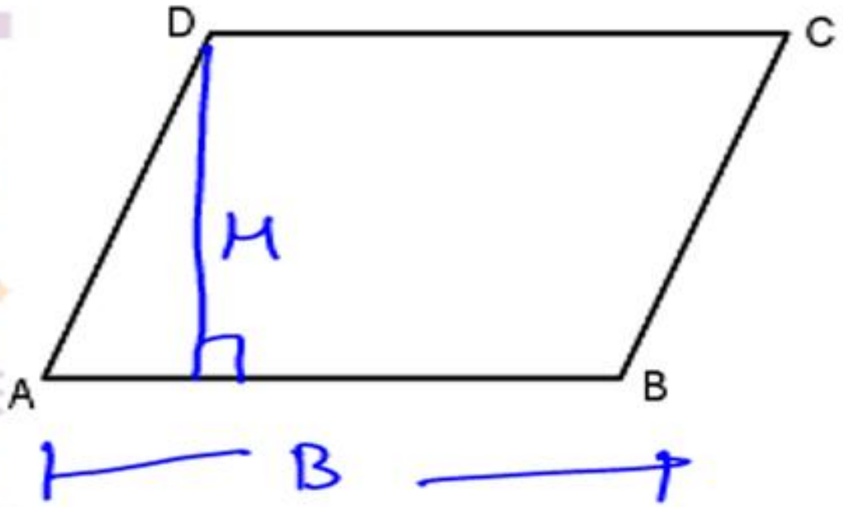
(ii) **Area of quadrilateral** = $\frac{1}{2} D_1 D_2 \sin\theta$

where, D_1, D_2 are diagonals of quadrilateral and θ is the angle between the diagonal.

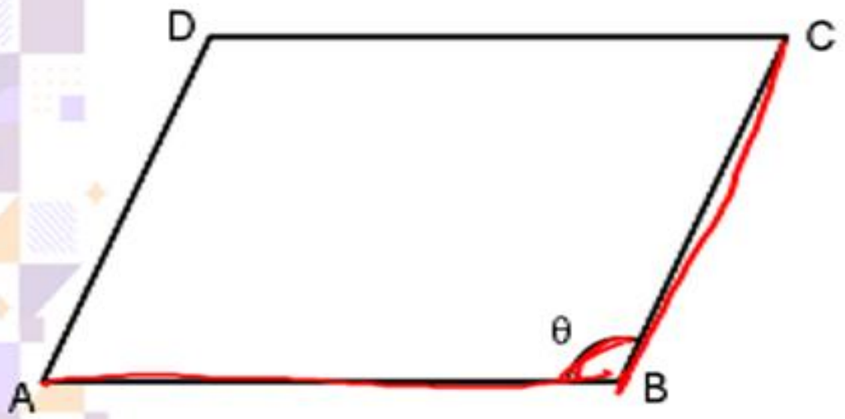
PARALLELOGRAM

Area of parallelogram :

(i) Base × Height

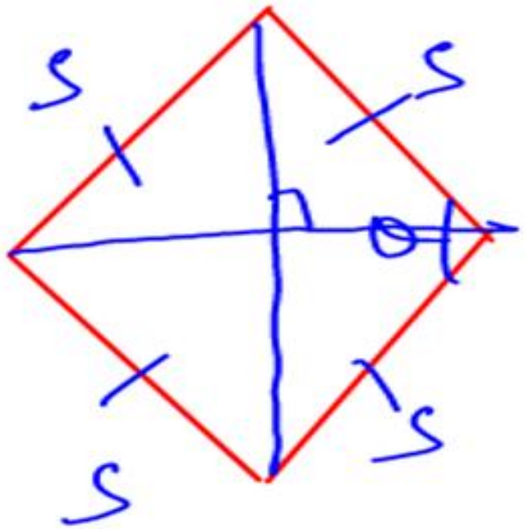


(ii) Area of parallelogram = $AB \cdot BC \cdot \sin\theta$



where, AB and BC are adjacent sides of a || gm and θ is the angle between them.

RHOM BUS



Perimeter of Rhombus = 4S

Area of Rhombus = $\frac{1}{2} D_1 D_2$

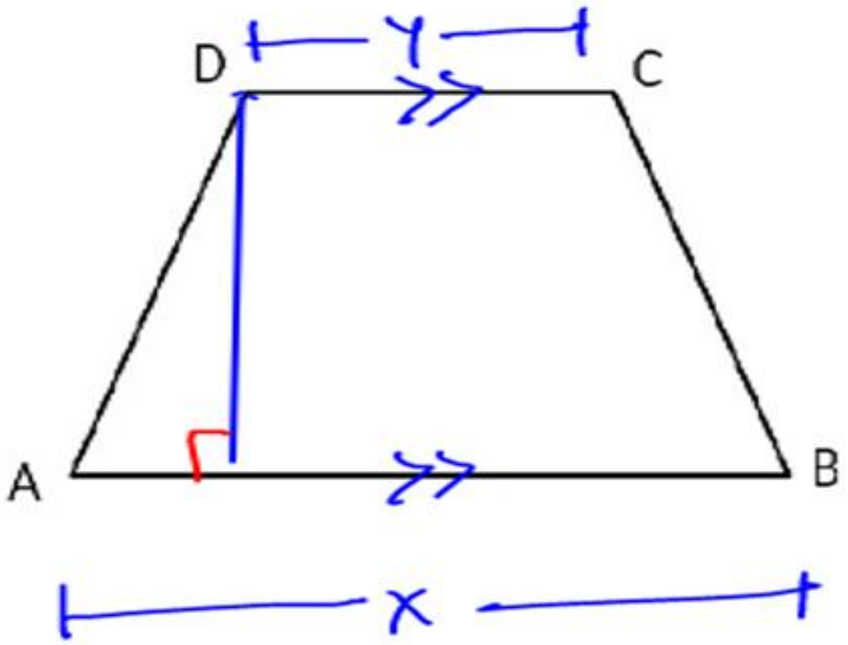
$= S^2 \cdot \sin\theta$

Where, θ is one of the angle of rhombus.

TRAPEZIUM

Area of trapezium = ½ × (Sum of parallel sides) × Distance between them

= ½ × (AB + CD) × H



$\frac{1}{2}(x+y) \times H$

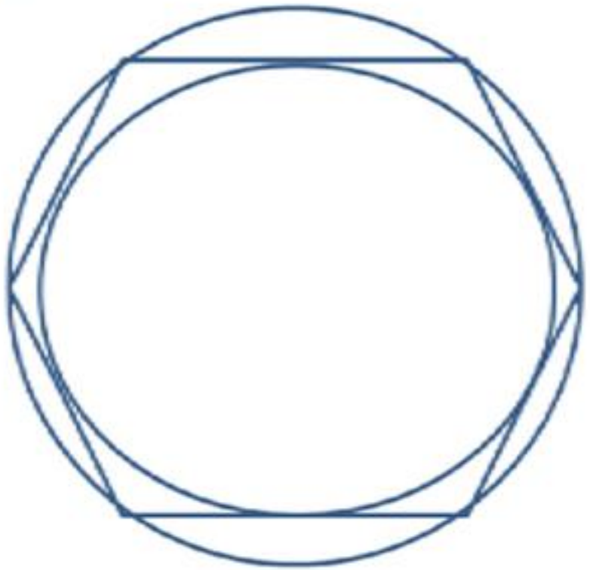
REGULAR POLYGON

Area of a regular polygon of n sides where length of each side is a

$$Area = \frac{na^2}{4}\cot\left(\frac{180}{n}\right)$$

Regular Polygon ⟶ All sides & All Angles are equal

IN RADIUS AND CIRCUM RADIUS OF A REGULAR POLYGON



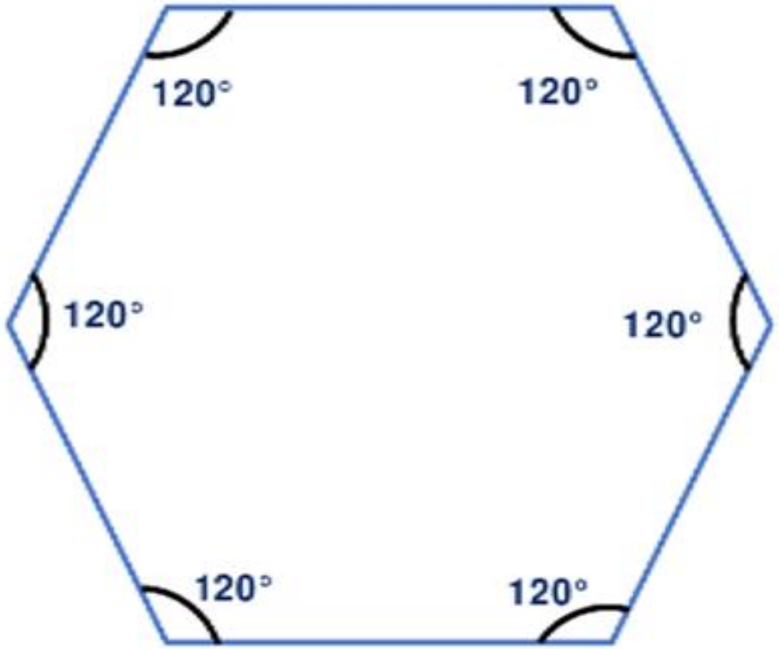
$$R = \frac{S}{2}\cos ec\left(\frac{180}{n}\right)$$

$$r = \frac{S}{2}\cot\left(\frac{180}{n}\right)$$

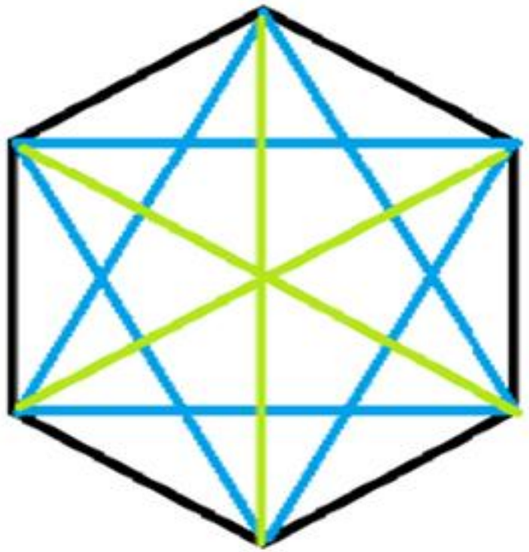
where *'S'* is side of a regular polygon.

Regular Hexagon

Def: 6 sided regular polygon is called as REGULAR HEXAGON.



DIAGONALS OF A REGULAR HEXAGON

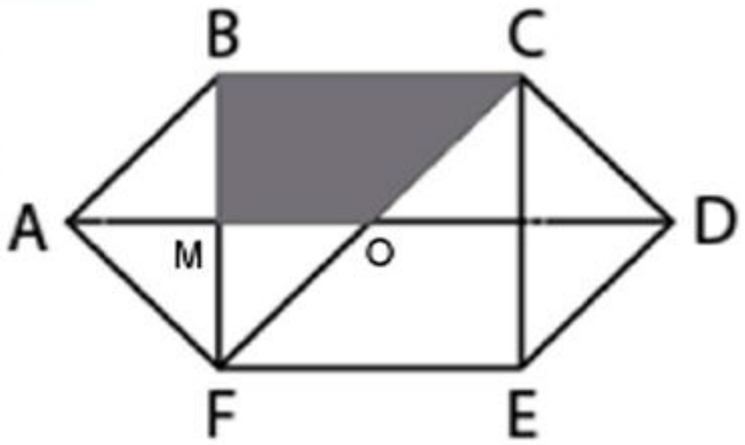


There are 6 smaller diagonals and 3 longer diagonals

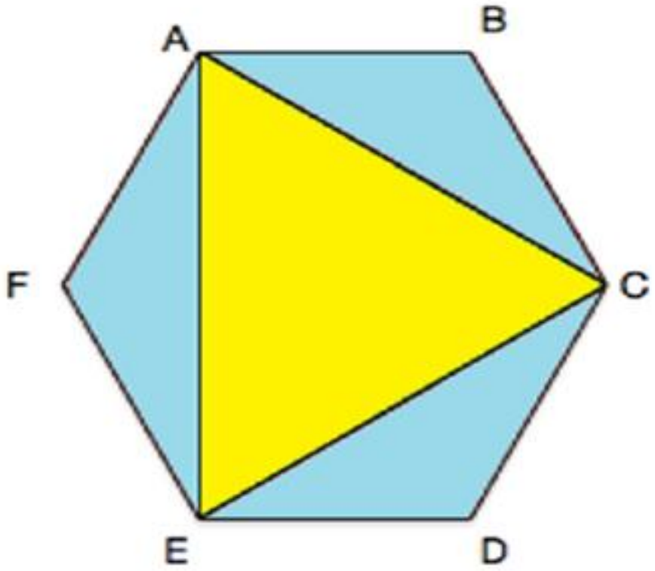
Length of smaller diagonal = $\sqrt{3} \cdot S$

Length of smaller diagonal = $2 \cdot S$

Eg. Find the area of shaded region : area of regular hexagon

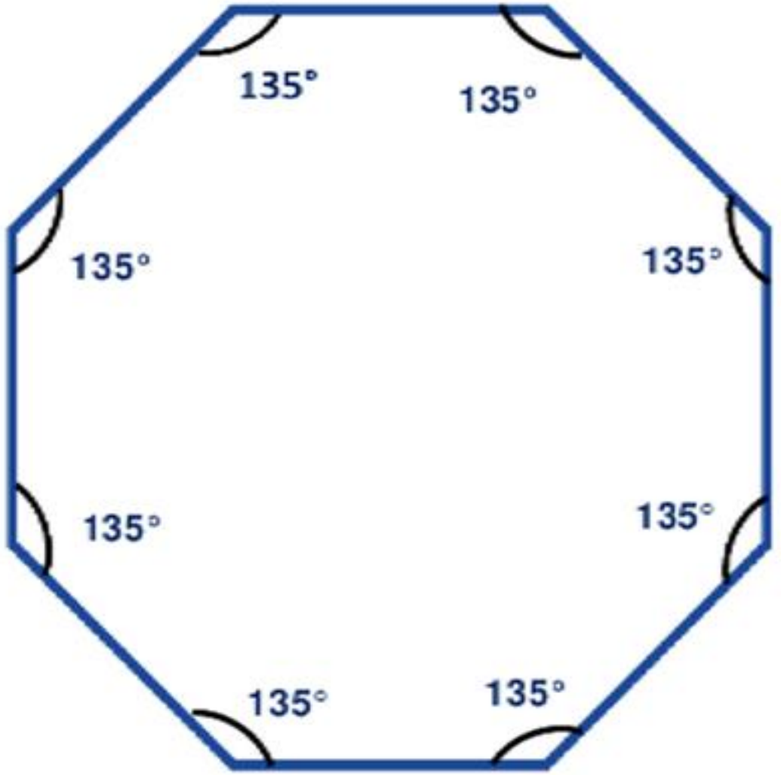


Eg. Find the area of ΔACE : area of regular hexagon

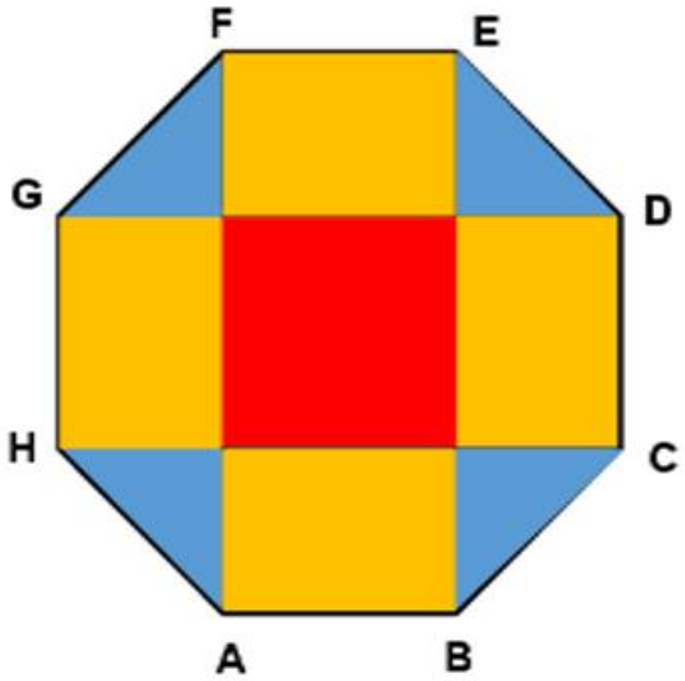


Regular Octagon

Def: 8 sided regular polygon is called as REGULAR Octagon.



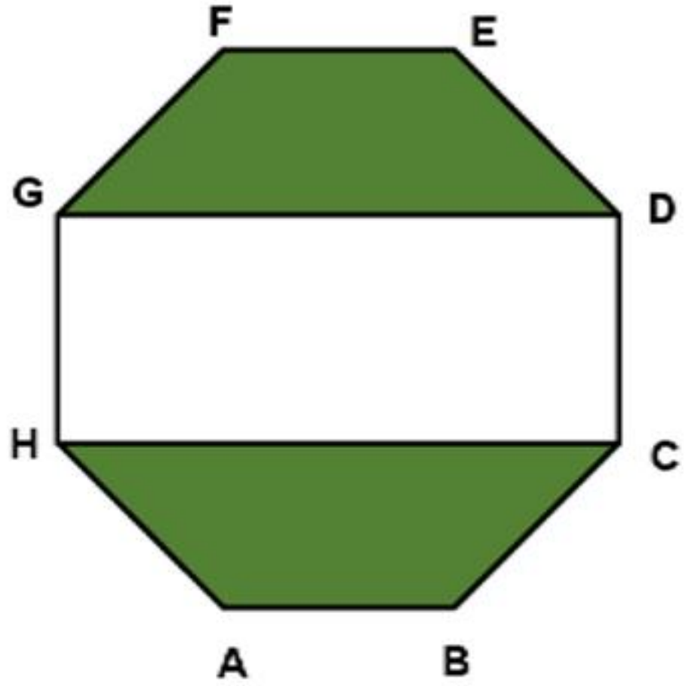
Area of Regular Octagon = $2\left(1+\sqrt{2}\right)a^2$



Q10. Each of the sides of this regular octagon has length 2 cm. What is the difference between the area of the shaded region and the area of the unshaded region (in cm^2)?

(a) 0 (b) 1

(c) 2 (d) $2\sqrt{2}$



PRACTICE QUESTIONS

Q1. What is the maximum area of a rectangle, the perimeter of which is 18 cm?

(a) 20.25 cm^2
(b) 20.00 cm^2
(c) 19.75 cm^2
(d) 19.60 cm^2

Ans. (a)

Q2. A rectangular carpet has an area of 120 m^2 and a perimeter of 46 metre. The length of its diagonal is

(a) 17 meter (b) 21 meter

(c) 13 meter (d) 23 meter

Ans. (a)

Q3. A path of uniform width runs round the inside of a rectangular field 38 m long and 32 m wide, If the path occupies 600 m^2, then the width of the path is

(a) 30 m
(b) 5 m
(c) 18.75 m
(d) 10 m

Ans. (b)

Q4. 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

(a) 8000 (b) 7000

(c) 7500 (d) 8200

Ans. (a)

Q5. A took 15 sec. to cross a rectangular field diagonally walking at the ratio 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:

(a) $30\ m^2$ (b) $40\ m^2$

(c) $50\ m^2$ (d) $60\ m^2$

Ans. (d)

Q6. 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 $\pi = 22/7$)

(a) 130 m
(b) 135 m
(c) 140 m
(d) 145 m

Ans. (c)

Q7. A rectangular park is 60 m long and 40 m wide. There are two paths in the middle of the plot parallel to its sides. The width of path is 4 meter. These paths cuts to each of the at right angle. Then find the cost of cementing the path at the rate of 7.50 Rs./m^2?

(a) Rs. 25780
(b) Rs. 2880
(c) Rs. 2650
(d) Rs. 2000

Ans. (b)

Q8. A playground is in the shape of rectangle. A sum of Rs. 1000 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?

(a) 1250
(b) 1000
(c) 1500
(d) 2250

Ans. (a)

Q9. An equilateral triangle is made on the diagonal of a square. Then find the ratio of their areas.

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

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

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

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

Ans. (a)

Q10. Four equal sized maximum circular plates are cut from a square paper sheet of area 784 sq. cm. The circumference of each plate is ;

(a) 22 cm (b) 44 cm

(c) 66 cm (d) 88 cm

Ans. (b)

Q11. A circle is inscribed in a square whose diagonal is $12\sqrt{2}$ cm. An equilateral triangle is inscribed in that circle. The length of the side of the triangle is ;

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

(b) $8\sqrt{3}$ cm

(c) $6\sqrt{3}$ cm

(d) $11\sqrt{3}$ cm

Ans. (c)

Q12. The length of one side of a rhombus is 6.5 cm and its altitude is 10 cm. If the length of its one diagonal be 26 cm, the length of the other diagonal will be ;

(a) 5 cm (b) 10 cm

(c) 6.5 cm (d) 26 cm

Ans. (a)

Q13. The measure of each of two opposite angles of a rhombus is 60° and the measure of one of its sides is 10 cm. The length of its smaller diagonal is:

(a) 10 cm

(b) $10\sqrt{3}$ cm

(c) $10\sqrt{2}$ cm

(d) $\frac{5}{2}\sqrt{2}$ cm

Ans. (a)

Q14. Perimeter of a rhombus is 2p unit and sum of the lengths of diagonals is m unit, then the area of the rhombus is

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

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

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

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

Ans. (c)

Q15. The two diagonals of a rhombus are of length 55 cm and 48 cm. If p is the height of the rhombus, then which one of the following is correct?

(a) 36 cm < p < 37 cm

(b) 35 cm < p < 36 cm

(c) 34 cm < p < 35 cm

(d) 33 cm < p < 34 cm

Ans. (a)

Q16. Area of a rhombus is 2016 cm^2 and one of its sides is 65 cm. Find its smaller diagonal.

(a) 10 cm
(b) 32 cm
(c) 20 cm
(d) 1.5 cm

Ans. (b)

Q17. The area of an isosceles trapezium is 176 cm^2 and the height is 2/11 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

(a) $2\sqrt{137}$

(b) 24

(c) $\sqrt{137}$

(d) 28

Ans. (a)

Q18. Side AB = 24 of a parallelogram ABCD is 24cm and side AD = 16 cm. The distance between AB and CD is 10 cm, then find the distance between AD and BC.

(a) 16 cm
(b) 18 cm
(c) 15 cm
(d) 26 cm

Ans. (c)

Q19. Two sides of a plot measuring 32m and the angle between them is a perfect right angle. The other two sides measure 25m each and the other three angles are not right angles. The area of the plot in m^2 is

(a) 786
(b) 534
(c) 696.5
(d) 684

Ans. (d)

Q20. The perimeter of a triangle is 24 cm and the circumference of its in-circle is 44 cm. Then the area of the triangle is (Take $\pi = 22/7$)

(a) 56 sq. cm (b) 48 sq. cm

(c) 84 sq. cm (d) 68 sq. cm

Ans. (c)

Q21. The perimeter of a triangle is 30 cm and its area is 30 cm^2. If the largest side measures 13m, what is the length of the smallest side of the triangle?

(a) 3 cm
(b) 4 cm
(c) 5 cm
(d) 6 cm

Ans. (c)

Q22. If 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 ratio of the area of ΔPQS and ΔPSR is

(a) 4 : 1
(b) 3 : 1
(c) 3 : 2
(d) 2 : 1

Ans. (b)

Q23. The perimeter of an isosceles, right-angled triangle is 2p unit. The area of the same triangle is

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

(b) $\left(2+\sqrt{2}\right)p^2$ sq. unit

(c) $\left(2-\sqrt{2}\right)p^2$ sq. unit

(d) $\left(3-\sqrt{2}\right)p^2$ sq. unit

Ans. (a)

Q24. 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

(a) 240
(b) 180
(c) 360
(d) 120

Ans. (d)

Q25. The perimeter of an isosceles triangle is 544 cm and each of the equal sides is 5/6 times the base. What is the area (in cm^2) of the triangle?

(a) 12,378 (b) 18,372

(c) 17,832 (d) 13872

Ans. (d)

Q26. One of the angles of a right-angled triangle is 15° and the hypotenuse is 1 m. The area of the triangle (in sq. cm.) is

(a) 1220
(b) 1250
(c) 1200
(d) 1215

Ans. (b)

Q27. ΔABC is an equilateral triangle, P and Q are two points on $\overline{AB}$ and $\overline{AC}$ respectively such that $PQ \parallel \overline{BC}$. If $PQ = 5$ cm, then area of ΔAPQ is :

(a) $\frac{25}{4}$ cm^2

(b) $\frac{15}{\sqrt{3}}$ cm^2

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

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

Ans. (c)

Q28. In an equilateral triangle ABC of side 10 cm, the side BC is trisected at D & E. Then the length (in cm) of AD is

(a) $3\sqrt{7}$

(b) $7\sqrt{3}$

(c) $\frac{10\sqrt{7}}{3}$

(d) $\frac{7\sqrt{10}}{3}$

Ans. (c)

Q29. The sides of a triangle are 50 cm, 78 cm and 112 cm then find its smallest altitude.

(a) 20 cm (b) 30 cm

(c) 40 cm (d) 50 cm

Ans. (b)

Q30. In the ΔABC, the base BC is trisected at D and E. The line through D, parallel to AB, meets AC at F and the line through E parallel to AC meets AB at G. If EG and DF intersect at H, then what is the ratio of the sum of the area of parallelogram AGHF and the area of the ΔDHE to the area of the ΔABC.

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{6}$

Ans. (b)

Q31. The area of circle whose radius is 6 cm is trisected by two concentric circles. The radius of the smallest circle is

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

(b) $2\sqrt{6}$ cm

(c) 2 cm

(d) 3 cm

Ans. (a)

Q32. A person rides a bicycle around a circular path of radius 50m. The radius of the wheel of the bicycle is 50 cm. The cycle comes to the starting point for the first time in 1 h. What is the number of revolutions of the wheel in 15 min?

(a) 20
(b) 25
(c) 30
(d) 35

Ans. (b)

Q33. What is the area of the larger segment of a circle formed by a chord of length 5 cm subtending an angle of 90° at the centre?

(a) $\frac{25}{4}\left(\frac{\pi}{2}+1\right)$ cm²

(b) $\frac{25}{4}\left(\frac{\pi}{2}-1\right)$ cm²

(c) $\frac{25}{4}\left(\frac{3\pi}{2}+1\right)$ cm²

(d) None of these

Ans. (c)

Q34. The short and long hands of a clock are 4 cm and 6 cm long respectively. The, the ratio of distance travelled by tips of short hand in 2 days and long hand in 3 days is

(a) 4 : 9
(b) 2 : 9
(c) 2 : 3
(d) 1 : 27

Ans. (b)

Q35. A circular swimming pool is surrounded by a concrete wall 4 m wide. If the area of the concrete wall surrounding the pool is 11/25 times that of the pool, then the radius (in m) of the pool.

(a) 8
(b) 16
(c) 30
(d) 20

Ans. (b)

Q36. 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 :

(a) 27

(b) $\pi[(3.5)^2 + (4.5)^2 + (5.5)^2]$

(c) 27p

(d) 13.5

Ans. (a)

Q37. A gear 12 cm in diameter is turning another gear 18 cm in diameter. when the smaller gear has 42 revolution. How many revolution has the larger one made?

(a) 28 (b) 20

(c) 15 (d) 24

Ans. (a)

Q38. 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 :

(a) 25 m
(b) 20 m
(c) 50 m
(d) 100 m

Ans. (c)

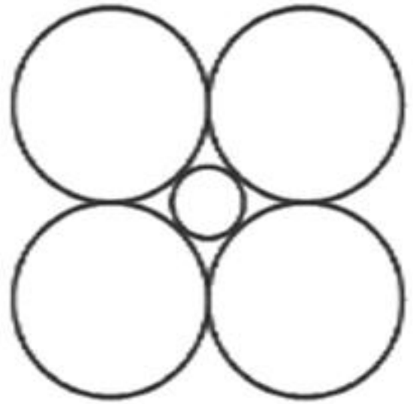
Q39. In the given figure, when all the outer circles have radii 'R' then the radius of the inner circle will be

(a) $\frac{2}{\left(\sqrt{2}+1\right)R}$

(b) $\frac{1}{\sqrt{2}}R$

(c) $\left(\sqrt{2}-1\right)R$

(d) $\sqrt{2}R$



Ans. (c)

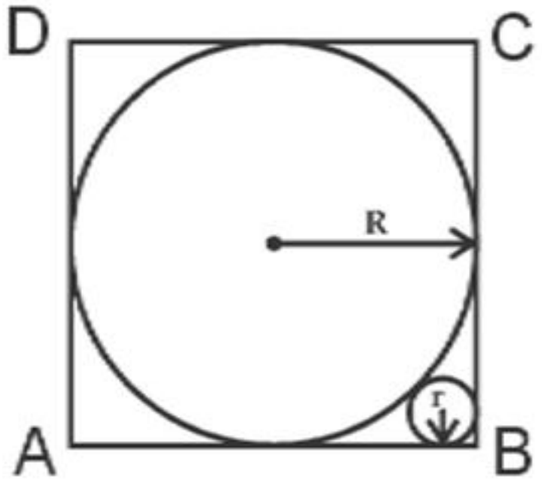
Q40. In the given figure ABCD is square, find the radius of smaller circle (r).

(a) $\left(\sqrt{3}-2\sqrt{2}\right)R$

(b) $2\left(\sqrt{2}-1\right)R$

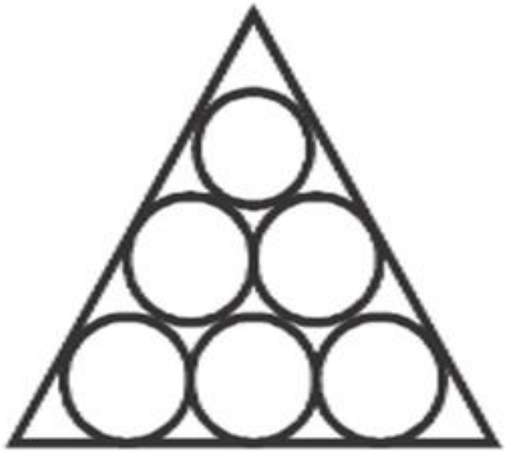
(c) $\left(3-2\sqrt{2}\right)R$

(d) None of these



Ans. (c)

Q41. An equilateral triangle circumscribes all the circles, each with radius 10 cm. What is the perimeter of the equilateral triangle?



(a) $20\left(2+\sqrt{3}\right)$ cm

(b) $30\left(2+\sqrt{3}\right)$ cm

(c) $60\left(2+\sqrt{3}\right)$ cm

(d) None of these

Ans. (c)

Q42. 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

(a) $18\ \text{cm}^2$

(b) $15\ \text{cm}^2$

(c) $\frac{2304}{49}\ \text{cm}^2$

(d) $\frac{576}{49}\ \text{cm}^2$

Ans. (d)

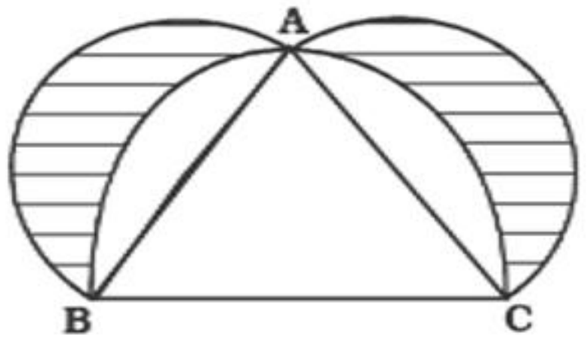
Q43. In the given figure, ΔABC is a right angled triangle, right angled at A. Semi-circles are drawn on the sides AB, BC and AC. Then, the area of shaded portion is equal to which one of the following?

(a) Area of ΔABC

(b) 2 times the area of ΔABC

(c) Area of semi-circle ABC

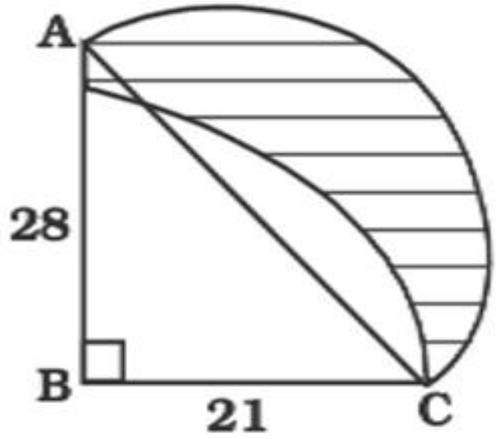
(d) None of the above



Ans. (a)

Q44. In the given figure, ABC is a right angled triangle, right angled at B. BC = 21 cm and AB = 28 cm. Width AC as diameter of a semi-circle and width BC as radius a quarter circle are drawn. What is the area of the shaded portion?

(a) 425 cm^2
(b) 425.47 cm^2
(c) 428 cm^2
(d) 428.75 cm^2



Ans. (d)

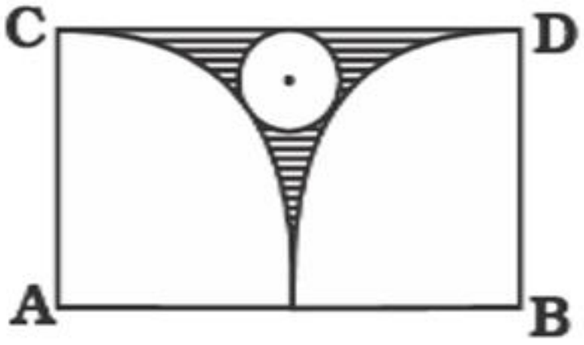
Q45. In the following figure ABCD is a rectangle with AD and DC equal to 1 and 2 units respectively. Two quarter circles are drawn with centres at B and A respectively. Now a circle is drawn touching both the quarter circles and the sides of the rectangle. Find the area of the shaded region.

(a) $\frac{32}{115}$ square units

(b) $\frac{13}{56}$ square units

(c) $\frac{16}{83}$ square units

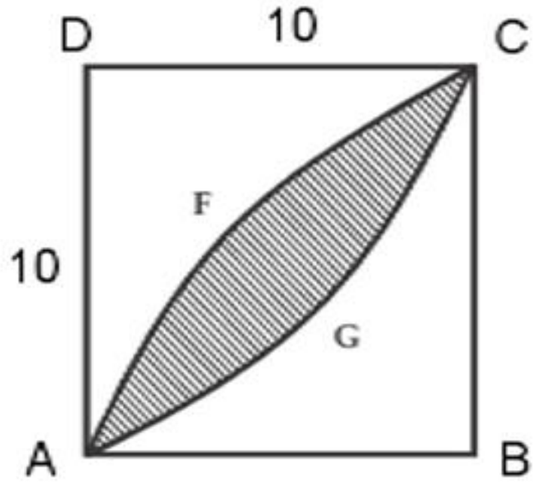
(d) $\frac{7}{20}$ square units



Ans. (b)

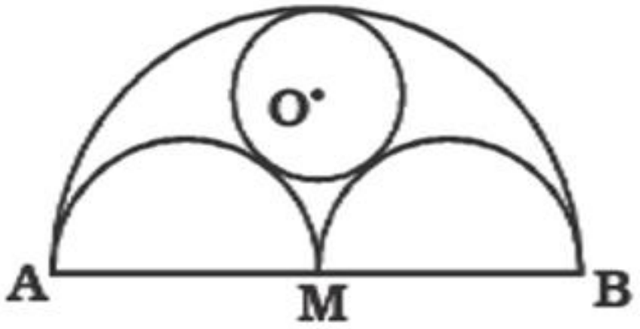
Q46. In the figure, ABCD is a square with side 10, BAC is and arc of a circle with centre B. ACD is and arc of a circle with centre A. What is the area of the shaded region.

(a) $100 - 50\pi$
(b) $50\pi - 100$
(c) $25\pi - 100$
(d) None of these



Ans. (b)

Q47. In the figure given below, AB is line of length 2a, with M as mid-point. Semi-circles are drawn on one side with AM, MB and AB as diameters. A circle with centre O and radius r is drawn such that this circle touches all the three semi-circles. What is the value of r ?



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

(b) $\frac{a}{2}$

(c) $\frac{a}{3}$

(d) $\frac{a}{4}$

Ans. (c)

Q48. Three circular sheets of the same radius are cut out from larger circular sheet. When the radius of each sheet cut out is the largest possible, then what is the ratio (approximate) of the area of the residual piece of the original sheet to its original total area?

(a) 0.30 (b) 0.35

(c) 0.40 (d) 0.45

Ans. (b)

Q49. 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?

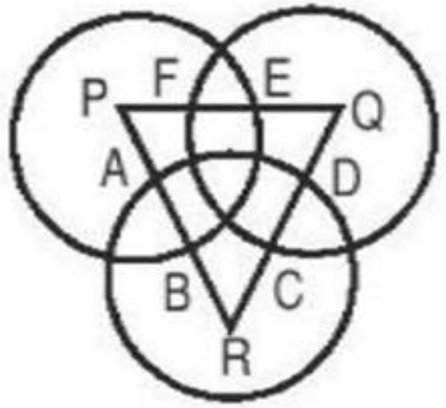
(a) $C = S = T$ (b) $C > S > T$

(c) $C < S < T$ (d) $S < C < T$

Ans. (b)

Q50. Three circles, each of radius 20, have centres at P, Q and R. Further, AB = 5, CD = 10 and EF = 12. What is the perimeter of ΔPQR?

(a) 120
(b) 66
(c) 93
(d) 87



Ans. (c)

Q51. Euclid has a triangle in mind. Its longest side has length 20 and another of its sides has length 10. Its area is 80. What is the exact length of its third side?

(a) $\sqrt{260}$

(b) $\sqrt{250}$

(c) $\sqrt{240}$

(d) $\sqrt{270}$

Ans. (a)

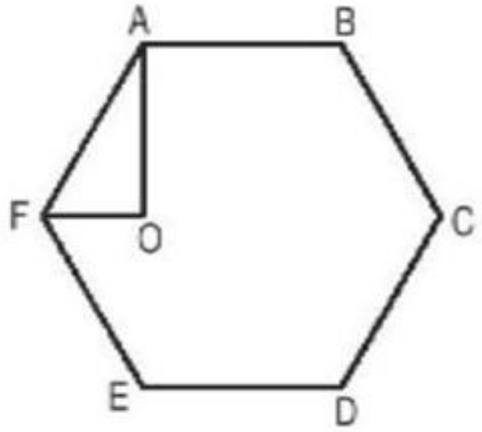
Q52. In the figure below, ABCDEF is a regular hexagon and $\angle AOF = 90°$. FO is parallel to ED. What is the ratio of the area of the triangle AOF to that of the hexagon ABCDEF?

(a) $\frac{1}{12}$

(b) $\frac{1}{6}$

(c) $\frac{1}{24}$

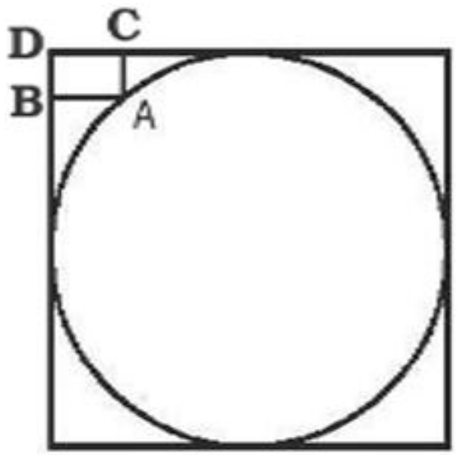
(d) $\frac{1}{18}$



Ans. (a)

Q53. In the given figure ABCD is rectangle at the corner which measures10 cm × 20 cm. The corner A of the rectangle is also a point on the circumference of the circle. What is the radius of the circle in cm?

(a) 10 cm
(b) 40 cm
(c) 50 cm
(d) None of the above.



Ans. (c)

Q54. Let S1be a square of side a. Another square S2 is formed by joining the mid-points of the sides of S1. The same process is applied to S2 to form yet another square S3, and so on. If A1, A2, A3, ... be the areas and P1, P2, P3, ... be the perimeters of S1, S2, S3, ..., respectively, then the ratio

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

(b) $\frac{2(2-\sqrt{2})}{a}$

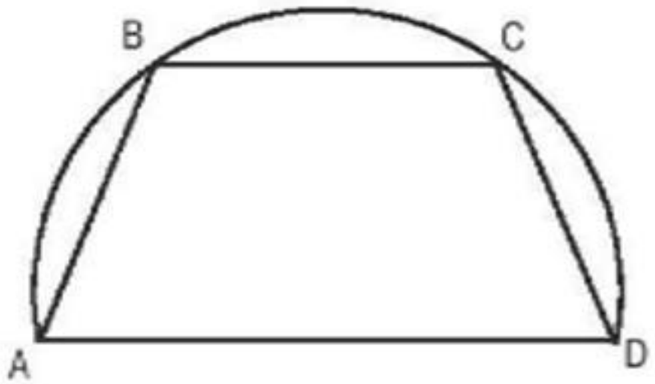
(c) $\frac{2(2+\sqrt{2})}{a}$

(d) $\frac{2(1+2\sqrt{2})}{a}$

Ans. (c)

Q55. On a semicircle with diameter AD, chord BC is parallel to the diameter. Further, each of the chords AB and CD has length 2, while AD has length 8. What is the length of BC?

(a) 7.5
(b) 7
(c) 7.75
(d) None of these



Ans. (b)

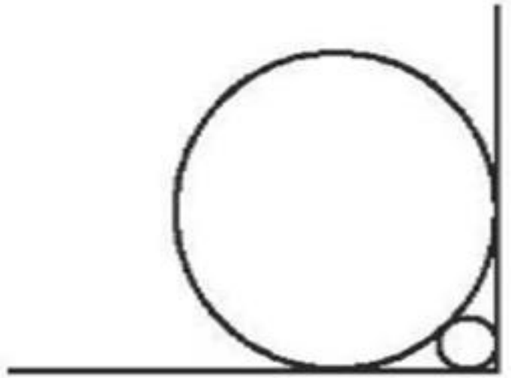
Q56. A circle with radius 2 is placed against a right angle. Another smaller circle is also placed as shown in the adjoining figure. What is the radius of the smaller circle?

(a) $3 - 2\sqrt{2}$

(b) $4 - 2\sqrt{2}$

(c) $7 - 4\sqrt{2}$

(d) $6 - 4\sqrt{2}$



Ans. (b)

Q57. P, Q, S and R are points on the circumference of a circle of radius r, such that PQR is an equilateral triangle and PS is a diameter of the circle. What is the perimeter of the quadrilateral PQSR?

(a) $2r\left(1+\sqrt{3}\right)$

(b) $2r\left(2+\sqrt{3}\right)$

(c) $r\left(1+\sqrt{5}\right)$

(d) $2r+\sqrt{3}$

Ans. (a)

Q58. A rectangular floor is fully covered with square tiles of identical size. The tiles on the edges are white and the tiles in the interior are red. The number of white tiles is the same as the number of red tiles. A possible value of the number of tiles along one edge of the floor is

(a) 10 (b) 12

(c) 14 (d) 16

Ans. (b)

Q59. ABCD is a quadrilateral such that AD=C=CA=20 units, BC = 12 units and ∠ABC = 90°. What is the approximate area of the quadrilateral ABCD?

A. 269 sq units
B. 300 sq units
C. 325 sq units
D. 349 sq units

Ans. (a)

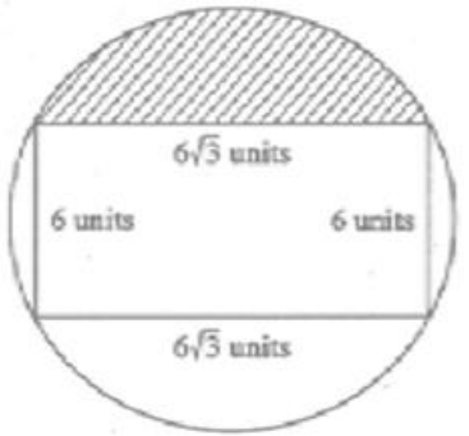
Q60. In the given figure, what is the area of the shaded region?

A. $9(\pi - \sqrt{3})$ sq units

B. $3(4\pi - 3\sqrt{3})$ sq units

C. $3(3\pi - 4\sqrt{3})$ sq units

D. $9(\sqrt{3} - \pi)$sq units



Ans. (b)

Q61. ABCD is a trapezium, where AB is parallel to DC. If AB = 4 cm, BC = 3 cm, CD = 7 cm and DA = 2 cm, then what is the area of the trapezium?

A. $22\sqrt{\frac{2}{3}}\,cm^2$

B. $22\sqrt{\frac{3}{2}}\,cm^2$

C. $22\sqrt{3}\,cm^2$

D. $\frac{22\sqrt{2}}{3}\,cm^2$

Ans. (d)

Q62. The length and breadth of a rectangle are in the ratio 4: 3. Then what is the ratio of the area of the triangle formed by the parts of the diagonals with a long side to the area of the triangle formed by the parts of diagonals with a short side ?

A. 3 : 4
B. 4 : 3
C. 16 : 9
D. 1 : 1

Ans. (d)

Q63. Out of 4 identical balls of radius r, 3 balls are placed on a plane such that each ball touches the other two balls. The 4th ball is placed on them such that this ball touches all the three balls. What is the distance of centre of 4th ball from the plane ?

A. $2\sqrt{\frac{2}{3}}\ r\ unit$

B. $\frac{\sqrt{3}+2\sqrt{2}}{\sqrt{2}}\ r\ unit$

C. $\frac{r}{3-2\sqrt{2}}\ unit$

D. $\frac{\sqrt{3}+2\sqrt{2}}{\sqrt{3}} r\ unit$

Ans. (a)

Q64. If area of a circle and a square are same, then what is the ratio of their perimeters?

A. $2\sqrt{\pi}$

B. $\sqrt{\pi}$

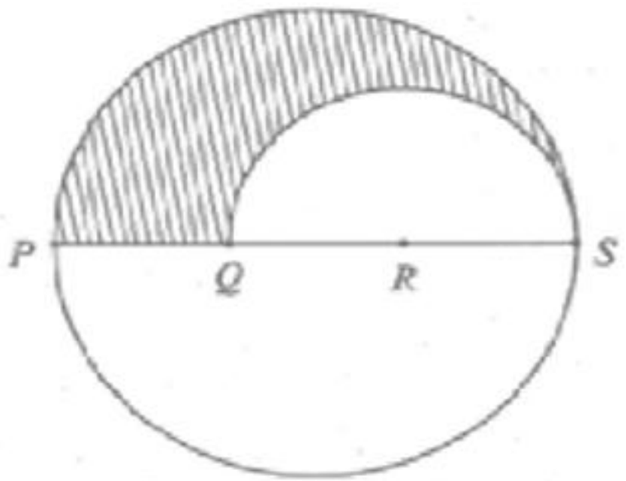
C. $\frac{\sqrt{\pi}}{2}$

D. $\frac{\sqrt{\pi}}{4}$

Ans. (c)

Q65. Let PQRS be the diameter of a circle of radium 9 cm. The length PQ, QR and RS are equal. Semi-circle is drawn with QS as diameter (as shown in the given figure). What is the ratio of the shaded region to that of the unshaded region?

A. 25 : 121
B. 5 : 13
C. 5 : 18
D. 1 : 2



Ans. (b)