MATHS

BOOKS - CENGAGE

CIRCLES

Worked Examples

1. Find the length of the chord of a circle of radius 13 cm, whose distance from the centre is 12 cm.

2. Find the length of the chord of a circle of radius 12 cm if its distance from the centre is 9 cm.

3. Find the length of the chord of a circle whose radius is 7.5 cm, if its distance from the centre is 4.5 cm.

4. Find the radius of a circle in which the length of a chord is 16 cm and its distance from the centre is 6 cm.

5. Find the radius of the circle in which a chord of length 14 cm is at a distance of 24 cm from the centre.

6. Find the radius of the circle in which a chord of length 16 cm is at a distance of 15 cm from the centre.

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7. Find the distance of a chord of length 12 cm from the centre of a circle of radius 10 cm.

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8. Find the distance of a chord of length 9 cm from the centre of a circle of radius 7.5 cm.

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9. In the figure, ACDB is a chord cutting two concentric circles with centre O. Find AB if CD = 8 cm, OD = 5 cm, and OB = 9 cm.

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10. In the figure, ABC is a triangle inscribed in a circle with centre O.

If AB = AC = 15 cm and BC = 5 cm, calculate the radius of the circle.

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11. ABC is an equilateral triangle of side 6 cm, a circle, centre O, passes through the vertices A, B, and C. Find the radius of the circle.

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12. The diameter of the driving wheel of a bus is 140 cm. How many revolutions per minute must the wheel make in order to keep a speed of 66 km/h?
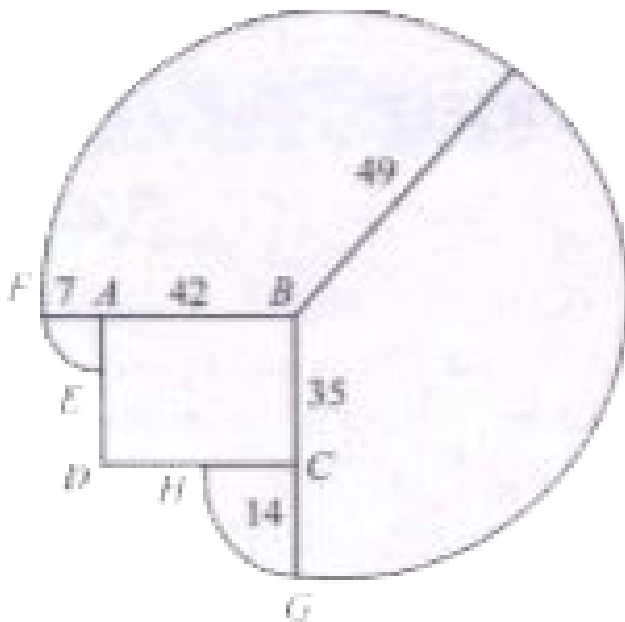
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13. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.

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14. A house measuring 42 dm . 35 dm is built in a huge grass ground. In one corner of the house, a cow is tethered with a rope of length 49 dm. Find the area grazed by the cow.

Test Yourself Level 1

1. The length of a chord of a circle is equal to the radius of the circle. Compare the distance of the chord from the centre with the radius of the circle.

2. An equilateral triangle is inscribed in a circles of radius 'a' unit. Find the length of the side of the triangle in terms of 'a'.

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3. In a circle of radius 20 cm, a chord subtends an angle of $120°$ at the centre of the circle. Determine the length of the chord.
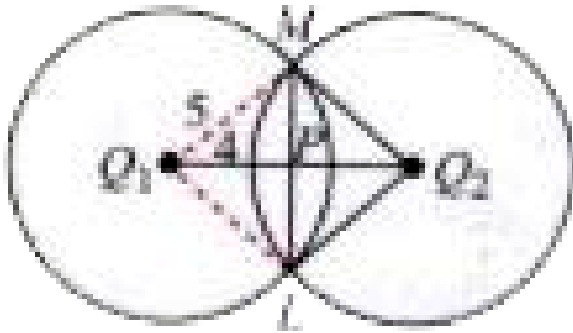
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4. Two parallel chords AB and CD of lengths 6 and 12 cm, respectively, are 3 cm apart. Find the radius of the circle.

5. The circles in the figure are of equal radii and cu at points L and M. If the distance between the centres O_1 and O_2 is 8 cm and

the radius is 5 cm, find LM.

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6. The difference between the circumference and the radius of a circle is 37 cm. Find the area of the circle.

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7. A wheel makes 1000 revolutions in covering a distance of 88 km. Find the radius of the wheel.

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8. A circular road runs round a circle. If th difference in the circumference between the outer and inner circles is 66 m, find the width of the road.

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9. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.

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10. A pendulum swings through an angle of $30°$ and describes an arc 8.8 cm in length. Find the length of the pendulum.

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1. The distance from the centre of the earth of the plane of Arctic Circle is 3700 miles (to the nearest 100 miles). The radius of the earth in 4000 miles. Find the radius of Arctic Circle.

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2. A ball of radius 4 cm floats in water immersed to a depth one-fourth its diameter. Calculate the circumference of the water-line circle.

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3. Four circular cardboard pieces each of radius 7 cm are placed in such a way that each piece touches two other pieces. Find the area of the space enclosed by the four pieces.

4. Four horses are tethered at four corners of a square plot of side 63 metres so that they just reach one another. Find the area left ungrazed inside the plot.

5. A building with base in the form of an equilateral triangle of side 14 cm is built in a huge grass field. In one corner of the building,

a cow is tethered with a rope of length 21 m. Find the area grazed by the cow.

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6. A toothed wheel of diameter 50 cm is attached to a smaller wheel of diameter 30 cm. How many revolutions will the smaller wheel make when the larger one makes 15 revolutions?

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7. If the diameter of a circle is increased by 100%, find the percentage increase in its area.
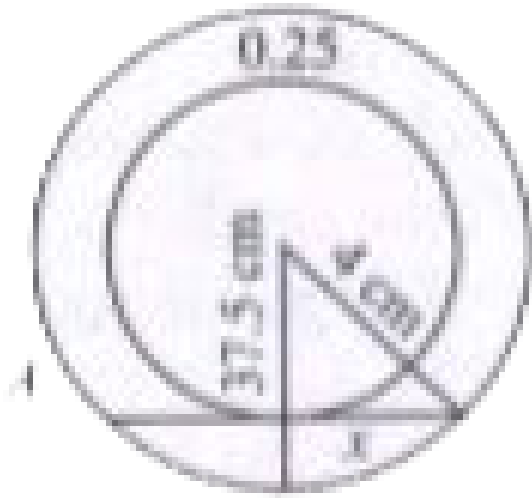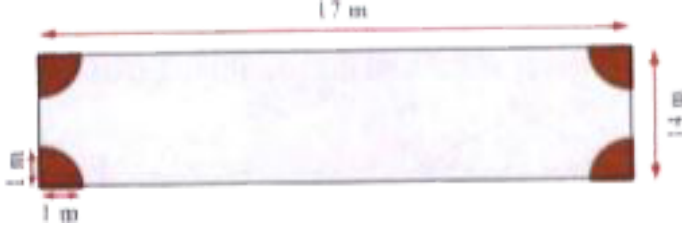
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Test Yourself Level 3

1. The diameter of an orange is 8 cm and the thickness of the rind is $\dfrac{1}{4} cm$. A piece is sliced off just grazing the flesh. Find the radius of

the piece.

2. The perimeter of the shaded portion in the given figure is
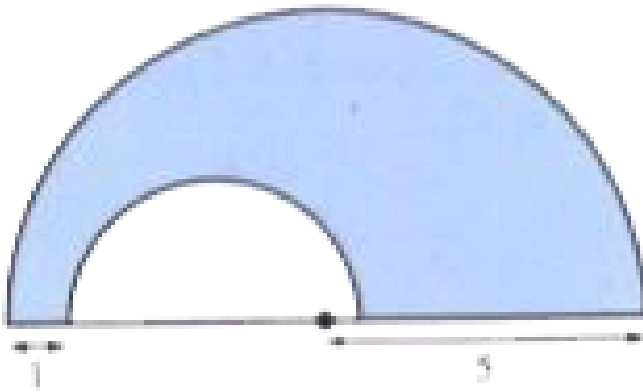
A. 40 m

B. 40.07 m

C. 14.28 cm

D. 35 cm

Answer: 14.28

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3. The area of the shaded portion in the figure is

A. 7.5π square units

B. 6.5π square units

C. 5.5π square units

D. 4.5π square units

Answer: 10.5π

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4. Find the area of largest possible square inscribed in a circle of unit radius.

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5. The hour and minute hands of a clock are 4 cm and 6 cm long respectively. Find the sum of the distances travelled by their tips in 2 days.

6. Three horses are tethered with 7 m long ropes at the three corners of a triangular field having sides 20, 34, and 42 m. Find the area of the plot which can be grazed by the horses. Also, find the area of the plot which remains ungrazed.

7. A grass ground measurs 7 m . 7 m. At two opposite corners two goats are tethered with a rope of length 7 m. Find the common area grazed by both the goats.

8. A building with the base in the form of a regular hexagon of side 7 m stands in a huge field. In one corner of the building, a cow is

tethered with a rope of length 14 m. Find the area grazed by the cow.

Test Yourself Multiple Choice Question

1. How many circles can pass through two fixed points?

    A. one

    B. two

C. zero

D. infinitely many

Answer: D

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2. How many circles can pass through three non-collinear points?

A. one

B. two

C. zero

D. infinitely many

Answer: A

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3. How many circles can pass through three collinear points?

A. one

B. two

C. zero

D. infinitely many

Answer: C

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4. A secant L intersects circle with radius a at two distinct points A and B in such a way that central angle is $60°$. Then length of AB is

A. a

B. 2a

C. $\sqrt{3}a$

D. $\dfrac{a}{2}$

Answer: A

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5. Ratio of circumference and radius of a circle

is equal to
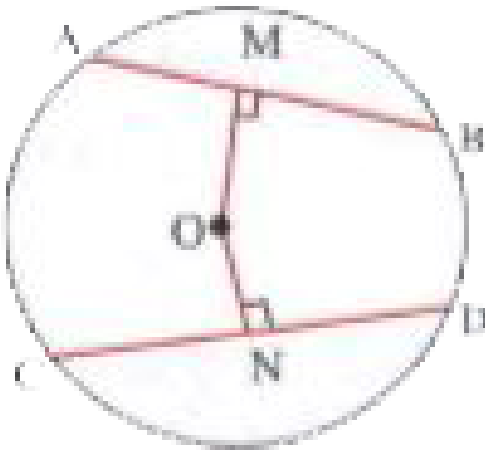
If AB = CD and O is the centre of circle then which of the following can be the values of OM and ON (in cm), respectively?

A. 5, 6

B. 6, 5

C. 4, 4

D. 3, 2

Answer: A

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6. If central angle of an arc is $60°$ then the ratio of areas of minor sector and major sector will be
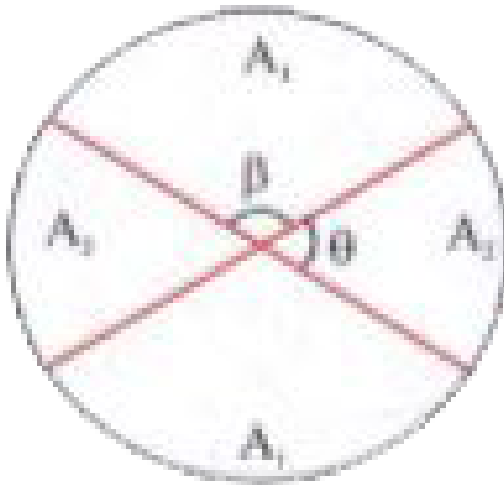
A. $1:5$

B. $1:3$

C. $2 : 4$

D. $2 : 3$

Answer: A

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7. If two diameters of a circle divide it in such a

way that the area of one part is 3 times the

other, then acute angle between diameters is

A. $90°$

B. $70°$

C. $60°$

D. $45°$

Answer: D

8. Distance between two parallel chords of lengths 8 cm and 6 cm is 1 cm. Then radius of circle will be

    A. 5 cm

    B. $\sqrt{12}cm$

    C. $3\sqrt{2}cm$

    D. 10 cm

Answer: A
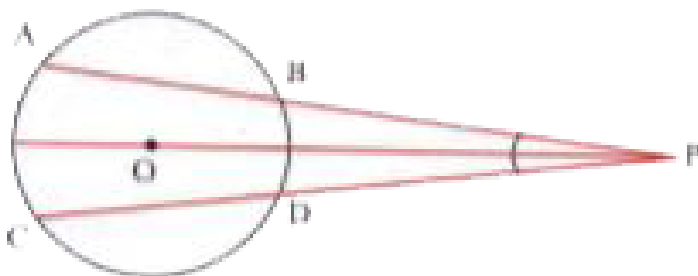
9.

If OP is the angular bisector of angle BPD an O

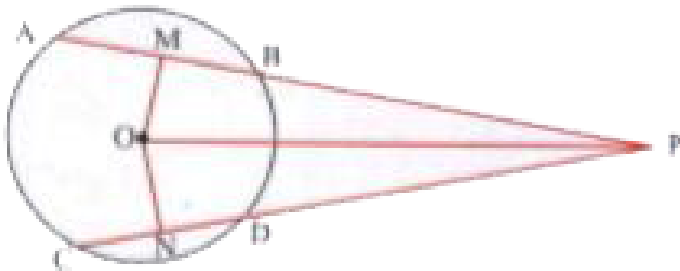is the centre, then which of the following is

correct?

A. AB = CD

B. $AB > CD$

C. $AB < CD$

D. $AB + CD = 2OP$

Answer: A

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10.

If OM = ON and $\angle OMP = \angle ONP = 90°$, where O is the centre, then which of following is correct?

A. $\angle OPM > \angle OPN$

B. $\angle OPM < \angle OPN$

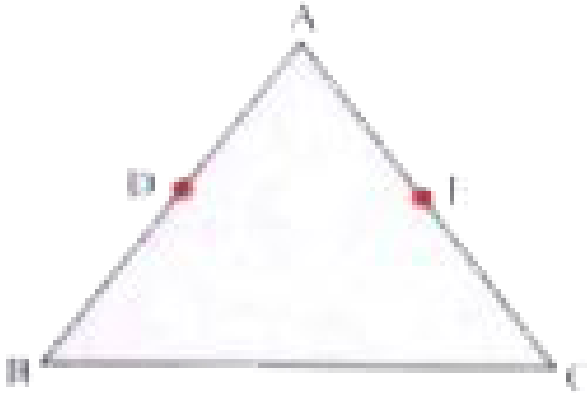C. $\angle OPM = \angle OPN$

D. $\angle OPM + \angle OPN = 270°$

Answer: C

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11.

ABC is an isosceles triangle with AB = AC. If AD

= AE then choose the correct alternatives.

    A. B, C, E and D will lie on a circle

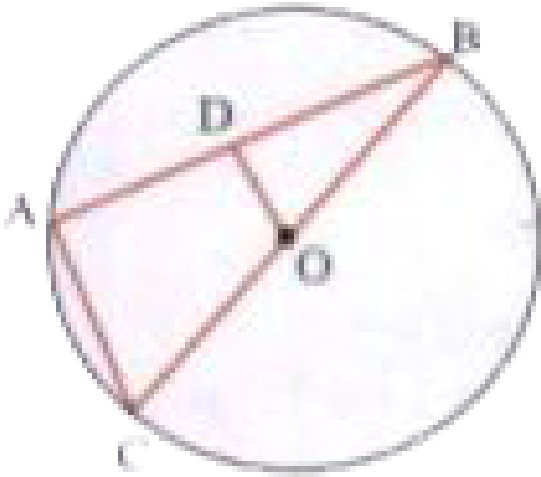   B. Any circle passing through B and C will

        also pass through D

C. Any circle passing through B and C will

also pass through E

D. B, C, E and D cannot lie on a circle

Answer: A

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12.

In the above diagram, BC is diameter, O is centre and $OD \perp AB$. If $AC = \lambda OD$, then value of λ is
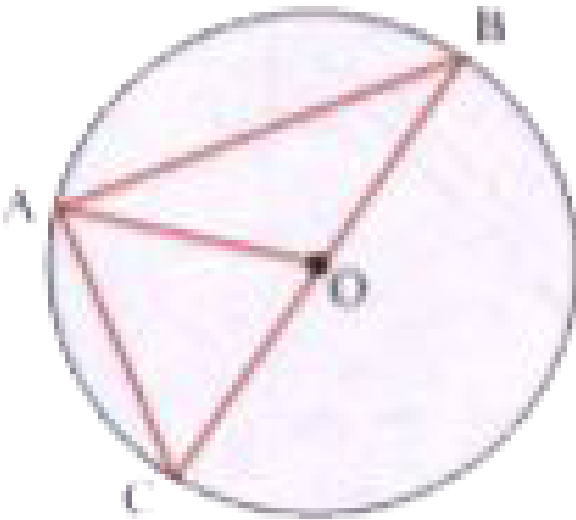
A. 2

B. 3

C. 1

D. $\dfrac{1}{2}$

Answer: A

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13.

In the above figure, O is the centre and BC = 6

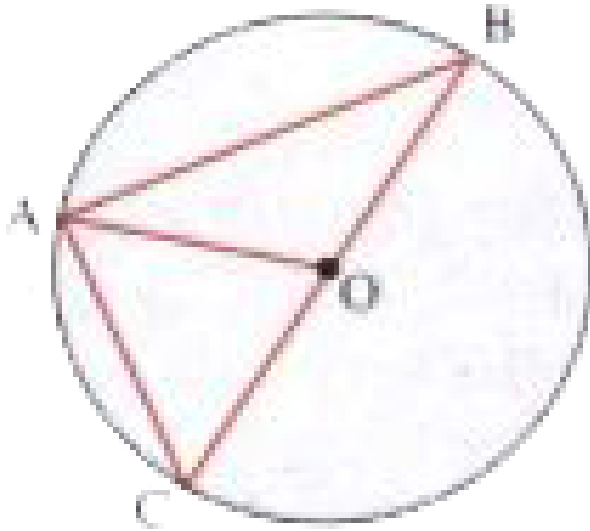cm. If $\angle OBA = 45°$, then area (ΔOAB) is

A. $18cm^2$

B. $4cm^2$

C. $9cm^2$

D. $4.5cm^2$

Answer: D

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14.

In the above figure, BC is diameter and O is centre. If area $(\Delta OAB) = k \times$ area (ΔOAC) then K is

    A. $\sqrt{2}$
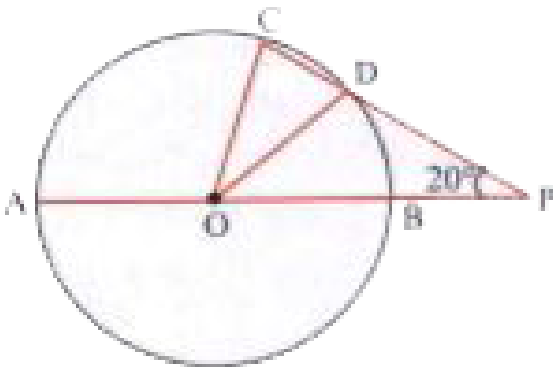
    B. $\dfrac{1}{2}$

C. 1

D. 2

Answer: C

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15.

In the above figure, AB is diameter with length

2x. If $\angle APC = 20°$ and $OD = DP$, where O

is the centre, then length of AC is

A. $\dfrac{x}{3}$

B. 2x

C. $\dfrac{x}{2}$

D. x

Answer: D

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16. A square of side length 2 cm is circumscribed by a circle, then area of circle is

A. $\sqrt{2}\pi cm^2$

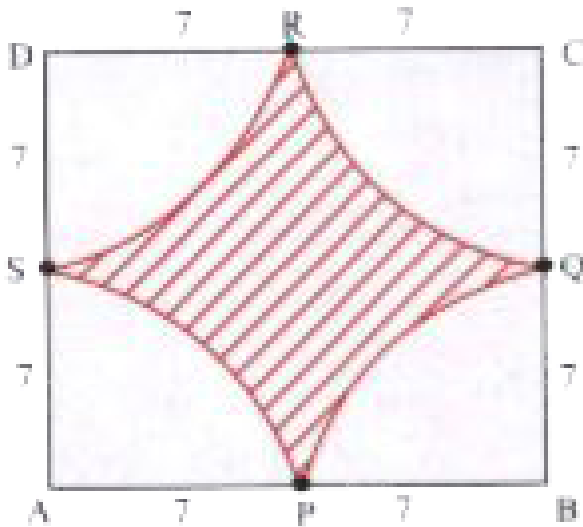B. πcm^2

C. $2\pi cm^2$

D. $8\pi cm^2$

Answer: C

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17.

In the above figure, ABCD is a square of side length 14 cm. Area of shaded region will be $\left(\pi = \dfrac{22}{7}\right)$

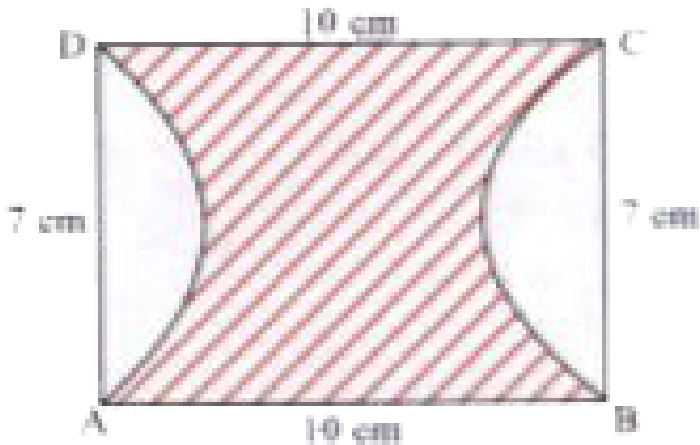A. $154 cm^2$

B. $42 cm^2$

C. $40 cm^2$

D. $54cm^2$

Answer: B

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18.

In the above figure, ABC is an equilateral

triangle of side length $\sqrt{3}cm$. Radius of incircle is
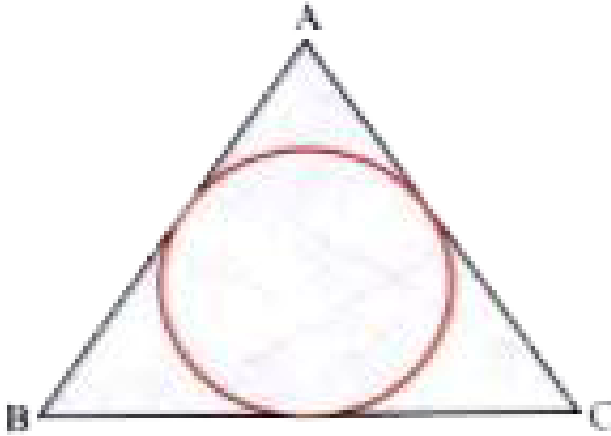
A. $3.8cm^2$

B. $31.5cm^2$

C. $30.5cm^2$

D. $31cm^2$

Answer: B

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19.

In the above figure, C_1, C_2 and C_3 are semicircles of diameters 14 cm, 7 cm and 7 cm, respectively. Area of shaded region is $\left(\pi = \dfrac{22}{7} \right)$

A. 1 cm

B. 2 cm

C. $\dfrac{1}{2}$ cm

D. $\dfrac{1}{3}$ cm

Answer: C

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20.

In the above figure C_1, C_2 and C_3 are

semicircles of diameters 14 cm, 7 cm and 7 cm, respectively. Area of shaded region is $\left(\pi = \dfrac{22}{7} \right)$
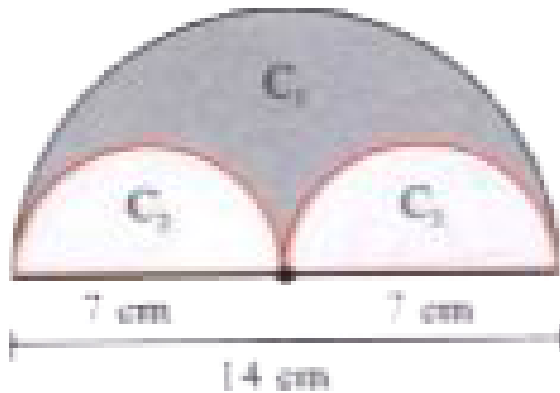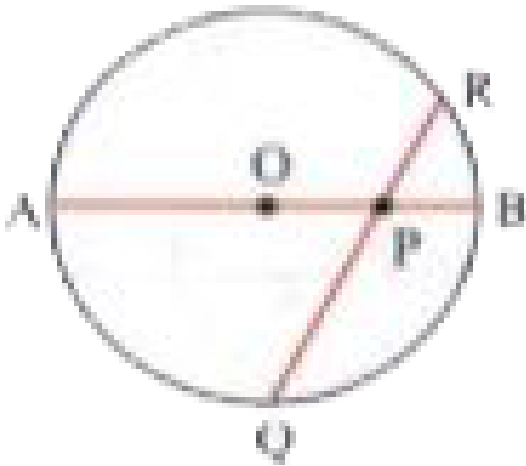
A. $38.5 cm^2$

B. $30.5 cm^2$

C. $31.5 cm^2$

D. $38 cm^2$

Answer: A

21.

In the above figure, AB is diameter of length 10 cm. If $\angle APQ = 45°$ and $QR = 8cm$ then length of OP is

A. 3 cm

B. 4 cm

C. $3\sqrt{2}cm$
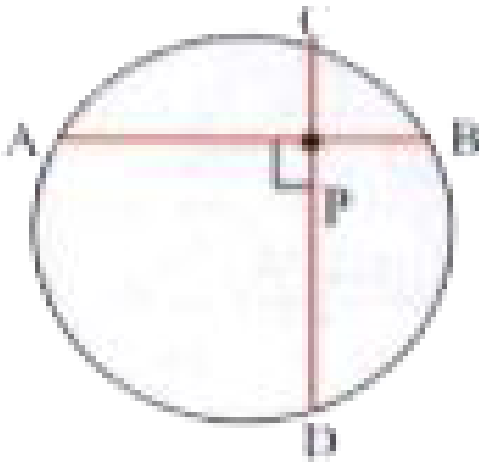
D. $\dfrac{3}{2} cm$

Answer: C

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22.

In the above circle two chords AB and CD

intersect at $90°$. If AP = 8 cm, PB = 4 cm, PC = 3 cm and PD = 9 cm, then radius of circle is

A. $3\sqrt{5}cm$

B. $5\sqrt{3}cm$

C. $3\sqrt{3}cm$

D. $5\sqrt{3}cm$

Answer: A

23. If perimeter of an equilateral triangle is equal to circumference of a circle with radius r. Then height of triangle is

A. $\dfrac{\pi r}{\sqrt{3}}$

B. $\dfrac{\pi r}{2\sqrt{3}}$

C. $\dfrac{\sqrt{3}\pi r}{2}$

D. $\dfrac{\pi r}{2}$

Answer: A

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24. If radius of circle C_1 is 2 times the radius of circle C_2, then ratio of area C_1 to that of C_2 is
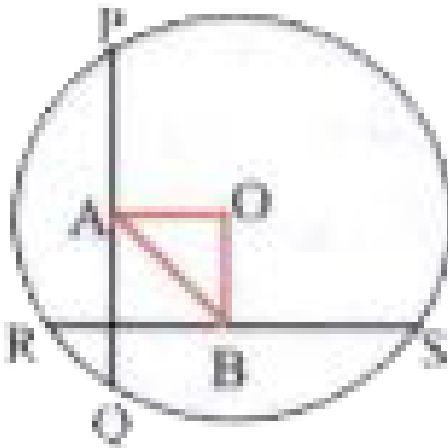
A. $4:1$

B. $2:1$

C. $1:4$

D. $1:2$

Answer: A

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1. In the figure, O is the center, PQ = RS, and A and B are the midpoints of PQ and RS, respectively. Which one is true?

A. $\angle OBS = 90°$

B. $\angle OAP = 90°$

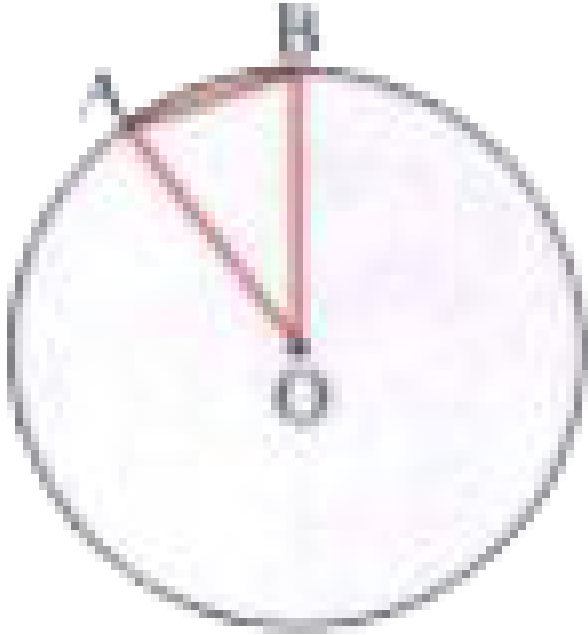C. $\angle OAB = \angle OBA$

D. All of these

Answer: D

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2. If the length of a chord AB is equal to the radius OA of the circle, then $\angle ABO$ equals (O

is the center)
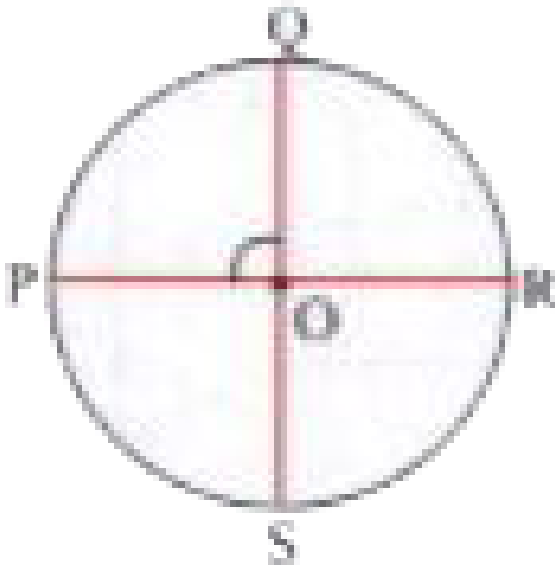

A. $120°$

B. $60°$

C. $45°$

D. $30°$

Answer: B

3. PR and QS are two diameters of a circle with center O such that $\angle POQ = 90°$. Then the

quadrilateral PQRS is a

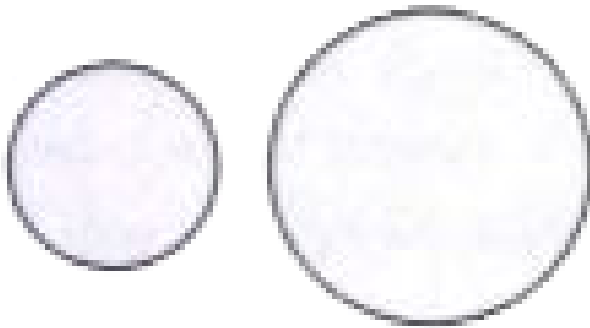A. rectangle

B. parallelogram

C. rhombus

D. square

Answer: C

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4. The number of circles that can be drawn touching both the given circles is

A. 2

B. 3

C. 4

D. 5

Answer: D

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5. The straight line drawn from the centre of a

circle perpendicular to a chord P the chord.

A straight line will not cut a circle in more

than O distinct points.

<u>R</u> chords of a circle are equidistant from the centre of the circle.

A.

P	Q	R
Trisect	Three	Perpendicular

B.

P	Q	R
Defines	Two	Equal

C.

P	Q	R
Bisects	Two	Equal

D.

P	Q	R
Bisects	Three	Parallel

Answer: C

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6. (i) If two chords of a circle are unequal, the smaller is nearer to the centre.

(ii) Infinitely many circles can be drawn passing through a given point with a given centre.

(iii) Diameter is the longest chord of a circle.

A.

(i)	(ii)	(iii)
F	T	T

B.

(i)	(ii)	(iii)
T	F	F

C.

(i)	(ii)	(iii)
F	T	F

D.

(i)	(ii)	(iii)
F	F	T

Answer: D

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