MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

CIRCUMFERENCE AND AREA OF A CIRCLE

Solved Examples

1. The area of a circular plot is 3850 square metres. What is the circumference of the plot?

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2. What is the length (in metres) of a rope, by which a cow must be tethered in order that it may game over an area of $616m^2$?

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3. The radius of a wheel is 0.25m. How many revolutions will it take in covering 11 km?

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4. Find the diameter of a wheel that makes 113 revolutions to go 2 km 26 decametres ? $\left(\pi = \frac{22}{7}\right)$

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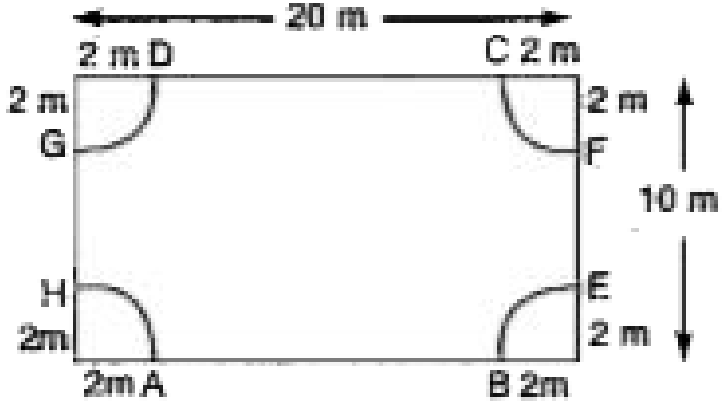
5. What is the perimeter of the given figure correct to one decimal place ?



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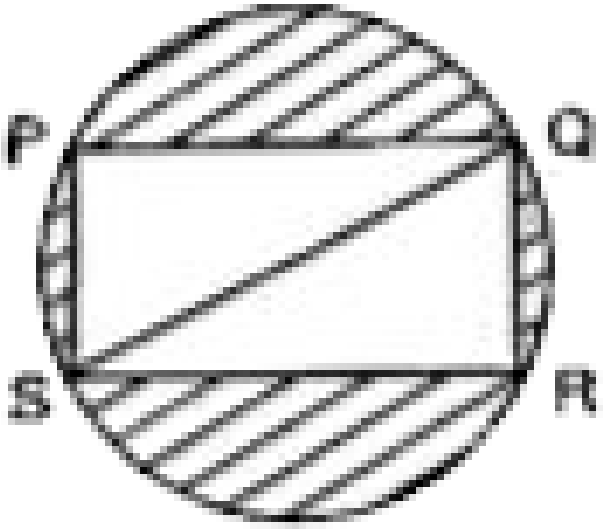
6. In the given figure PQRS is a rectangle of $8cm \times 6cm$ inscribed in a circle. What is the

area of the shaded portion?



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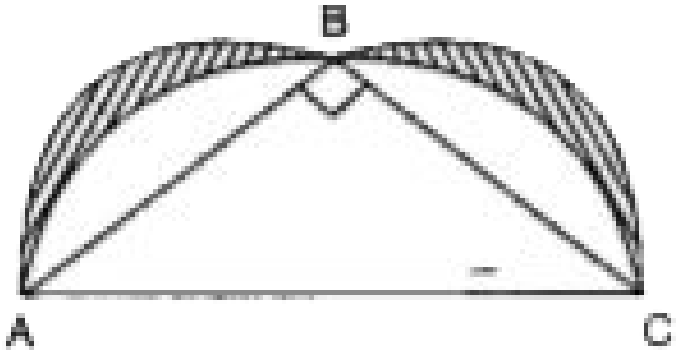
7. In the given figure, ABC is a right angled triangle with B as right angle. Three semicircles are drawn with AB, BC and AC as

diameters. What is the area of the shaded portion, if the area of ΔABC is 12 square units ?



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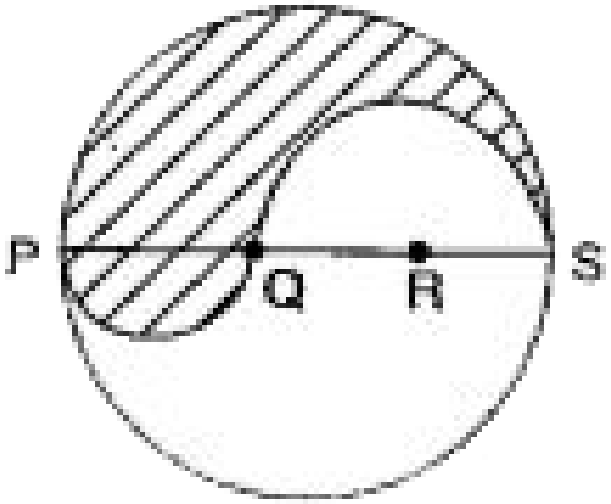
8. PQRS is a diameter of a circle, the lengths of PQ, QR and RS are equal Semi circle are drawn on PQ and QS to create the shaded figure or

given. What is the perimeter of the shaded figure .



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9. If a wire is bent into the shape of a square, then the area of the square is 81 sq. cm. When

the wire is bent into a semi-circular shape, then the area of the semi-circle will be (a) 22 cm2 (b) 44 cm2 (c) 77 cm2 (d) 154 cm2

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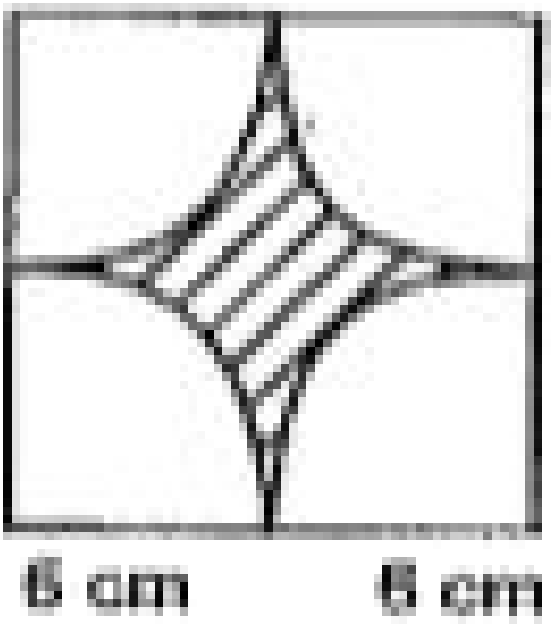
10. The quadrants shown in the given figure are each of diameter 12 cm . What is the area

of the shaded protion?



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11. If the radius of the circle is increased by 50%, then by how much per cent the area of

the circle is increased?

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12. Three circles of radii r_1, r_2 and r_3 are drawn concentric to each other. The radii r_1 and r_2 are such that the area of the circle with radius r_1 is equal to the area between the circle of radius r_2 and r_1 . The area between the circle of radii r_2 and r_3 is equal to area between the circle of radii r_2 and r_r . What is the value of $r_1 : r_2 : r_3$?

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13. The ratio of the outer and inner perimeters of a circular path is 23:22. If the path is 5 m wide, what is the diameter of the inner circle ? Also , find the area of path enclosed between the two circle?

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14. A square circumscribes a circle and another square is inscribed in this circle with one

vertex at the point of contact. The ratio of the areas of the circumscribed and the inscribed squares is (a) 1 (b) 2 : 1 (c) 3 (d) 4

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15. An equilateral triangle, a square and a circle have equal perimeters. If T denotes the area of triangle, S, the area of square and C, the area of the circle, then :

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Question Bank 22

1. If the perimeter of a semicircle is 18 cm, what will be its diameter ?

A. 9 cm

B. 28 cm

C. 14 cm

D. 7 cm

Answer: D

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2. What is the area of a circle with circumference 88 cm ?

A. 616 sq cm

B. 546 sq cm

C. 600 sq cm

D. 615 sq cm

Answer: A

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

A. 344.5 sq cm

B. 364.5 sq cm

C. 346.5 sq cm

D. 366.5 sq cm

Answer: C

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4. The number of revolutions a wheel of diameter 40 cm makes in travelling a distance of 176 m is $\left(\pi = \frac{22}{7}\right)$

A. 140

B. 150

C. 160

D. 166

Answer: A

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5. The diameter of a bullock cart wheel is $\frac{14}{11}$ metres. This wheel makes 10 complete revolutions per minute. What would be the speed of the cart in kilometres per hour ?

A. 4.8

B. 9.6

C. 8.8

D. 2.4

Answer: D

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6. Diameter of a wheel is 3 m. The wheel revolves 28 times in a minute. To cover 5.280 km distance, the wheel will take (Take $\pi = \frac{22}{7}$):

A. 10 minutes

B. 20 minutes

C. 30 minutes

D. 40 minutes

Answer: B

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7. A circular park has a path of uniform width around it. The difference between the outer and inner circumferences of the circular path is 132 m. Its width is (a) 20 m (b) 21 m (c) 22 m (d) 24 m

A. 22 m

B. 20 m

C. 21 m

D. 24 m

Answer: C

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8. The difference between the radii of the smaller circle and the bigger circle is 7 cm and the difference between the areas of the two circles is 1078 sq cm. What is the radius of the smaller circle in cm?

A. 28

B. 21

C. 17.5

D. 35

Answer:

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9. A circular grass plot 40 m in radius is surrounded by a path. If the area of the grass plot is twice the area of the path, the width of the path in metres would be

A. $40\left(1+\sqrt{\frac{2}{3}}\right)$

B. $40\left(1-\sqrt{\frac{2}{3}}\right)$

C. $40\left(\sqrt{\frac{3}{2}}-1\right)$

D. $40\left(\sqrt{\frac{3}{2}}+1\right)$

Answer: C

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10. A circular disc of area A_1 is given. With its radius as diameter, a circular disc of area A_2 is

cut out of it. The area of the remaining disc is denoted by A_3. Then,

A. $A_1A_3 < 16A_2^2$

B. $A_1A_3 > 16A_2^2$

C. $A_1A_3 = 16A_2^2$

D. $A_1A_3 > 2A_2^2$

Answer: A

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11. If the difference between the circumference and diameter of a circle is 30 cm, then what is the radius of the circle ?

A. 14 cm

B. 3.5 cm

C. 7 cm

D. 6 cm

Answer: C

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12. If the circumference of a circle is reduced by 50%, then by how much per cent is the area of the circle reduced ?

A. $25\ \%$

B. $50\ \%$

C. $65\ \%$

D. $75\ \%$

Answer: D

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13. A wire is looped in the form of a circle of radius 21 cm. It is rebent in the shape of an equilateral triangle. Find the area of the triangle. (Take $\pi = \frac{22}{7}$)

A. $484cm^2$

B. $484\sqrt{3}cm^2$

C. $308cm^2$

D. $308\sqrt{3}cm^2$

Answer: B

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14. A circular wire of diameter 42 cm is bent in the form of a rectangle whose sides are in the ratio 6:5. The area of the rectangle is $\left(\pi = \frac{22}{7}\right)$

A. $540cm^2$

B. $1080cm^2$

C. $2160cm^2$

D. $4320cm^2$

Answer: B

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15. If the areas of a circle and a square are equal then the ratio of their perimeters is (a) 1 : 1 (b) $2:\pi$ (c) $\pi:2$ (d) $\sqrt{\pi}:2$

A. $1:1$

B. $2:1$

C. $1:2$

D. $\sqrt{\pi}:2$

Answer: D

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16. A right angled isosceles triangle is inscribed in a circle of radius r. What is the area of the remaining portion of the circle ?

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

B. $\left(\pi - \frac{1}{2}\right) r^2$

C. $(\pi - 1) r^2$

D. $(\pi - 2) r^2$

Answer: C

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17. The largest possible square is inscribed in a circle of 2π units circumference. The area of the square in square units is

A. $4\pi\sqrt{2}$

B. $2\pi\sqrt{2}$

C. $\sqrt{2}$

D. 2

Answer: D

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18. If the circumference and the area of a circle are numerically equal, then what is the numerical value of the diameter ?

A. 1

B. 2

C. 4

D. π

Answer: C

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19. What is the perimeter of a square whose area is equal to that of a circle with perimeter $2\pi x$?

A. $2\pi x$

B. $\sqrt{\pi}x$

C. $4\sqrt{\pi x}$

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

Answer: D

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20. If the circumference of a circle increases form 4π to 8π , what change occurs in its area? (a) It is halved. (b) It doubles. (c) It triples. (d) It quadruples.

A. Change= $2 \times$ Original area

B. Change = $3 \times$ Original area

C. No change

D. Change = $4 \times$ Original area

Answer: B

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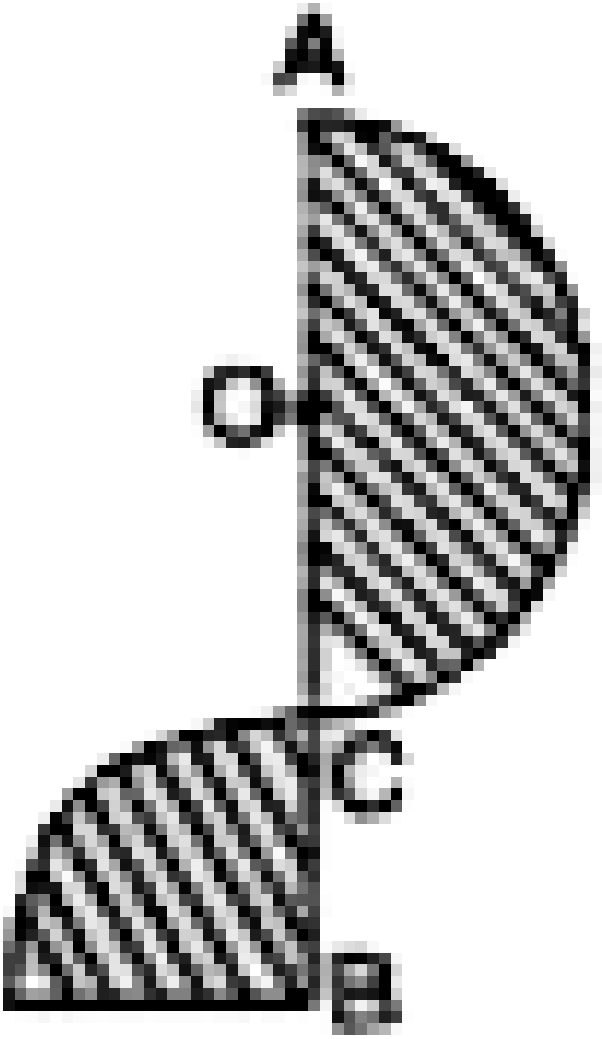
21. This figure is made up of a semicircle and quarter of a circle. The length of $AB = 9.1cm$. The distance from A to the centre of the

semicircle is 3.5 cm. The area of the figure is



A. $25cm^2$

B. $28.26cm^2$

C. $22.715cm^2$

D. $88cm^2$

Answer: C

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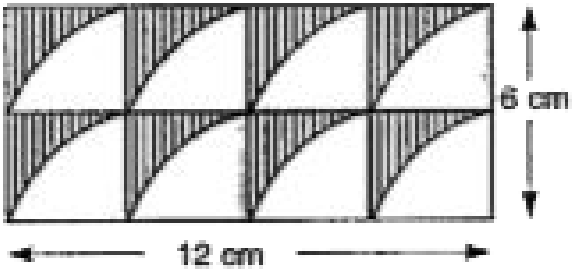
22. The figures in the rectangle are 8 identical quadrants. What is the area of the shaded

part ? (Take $\pi = 3.14$)



A. $22.52cm^2$

B. $15.48cm^2$

C. $56.52cm^2$

D. $28.36cm^2$

Answer: B

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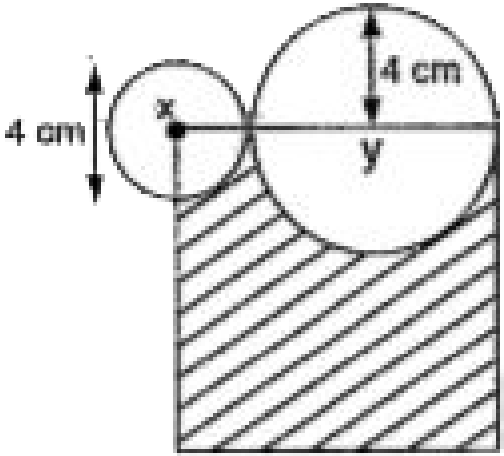
23. X and Y are the centres of 2 circles on a square as shown in the figure. What is the area of the shaded portion ? (Take $\pi = 3.14$)



A. $25.12cm^2$

B. $28.26cm^2$

C. $71.74cm^2$

D. $88cm^2$

Answer: C

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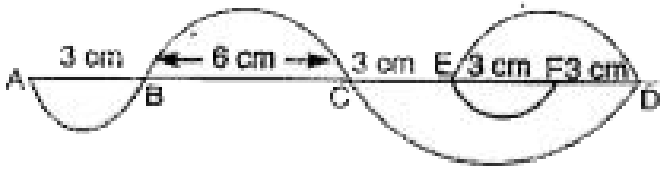
24. A wire is bent into the shape as shown. It is made up of 5 semi-circles. What is the length of the wire? (Take $\pi = 3.14$)



A. 27 cm

B. 42.39 cm

C. 45 cm

D. 27.92 cm

Answer: B

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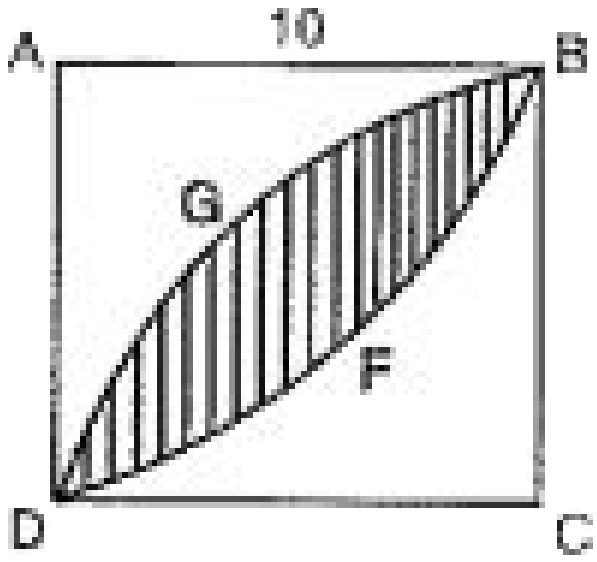
25. In the given figure, ABCD is a square with side 10 cm. BFD is an arc of a circle with centre C and BGD is an arc of a circle with centre A. What is the area of the shaded region in

square centimetres ?



A. $100 - 50\pi$

B. $100 - 25\pi$

C. $50\pi - 100$

D. $25\pi - 100$

Answer: C

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26. If a triangle of base 6 cm has the same area as that of a circle of radius 6 cm, then the altitude of the triangle is

A. 6π cm

B. 8πcm

C. 10πcm

D. 12π cm

Answer: D

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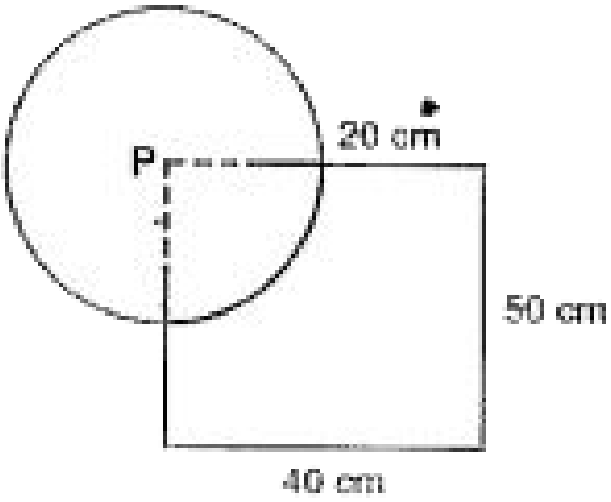
27. In the given figure, P is the centre of the circle. The area of the figure is



A. $3256cm^2$

B. $2492cm^2$

C. $2942cm^2$

D. $3256cm^2$

Answer: C

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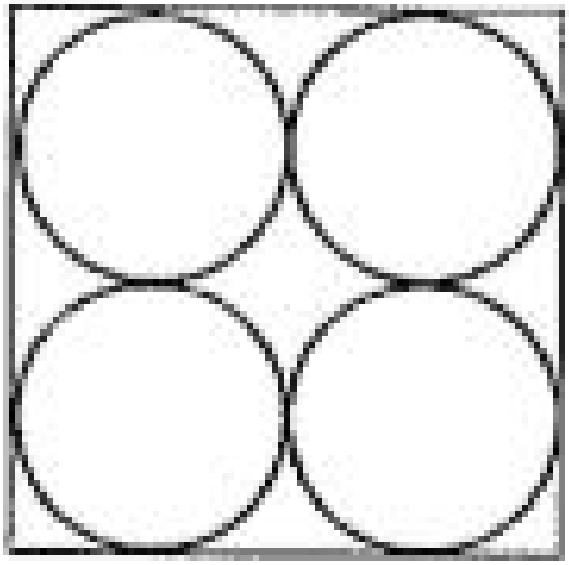
28. Four identical coins are placed in a square. For each coin, the ratio of area to circumference is the same as the ratio of circumference to area. The area of the square

not covered by the coins is



A. $16(\pi - 1)$

B. $16(8 - \pi)$

C. $16(4 - \pi)$

D. $16\left(4 - \frac{\pi}{2}\right)$

Answer: C

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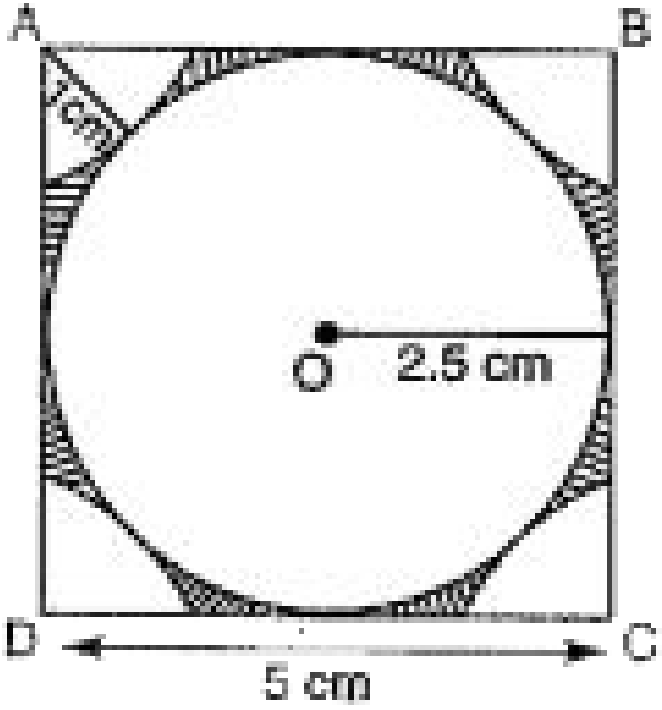
29. ABCD is a square of side 5 cm. At the four corners, four circular arcs each of radius. 1 cm are drawn. A circle of radius 2.5 cm with centre O is drawn inside the square. What is the

approximate area of the shaded portion ?



A. $1cm^2$

B. $1.4cm^2$

C. $1.8cm^2$

D. $2.2cm^2$

Answer: D

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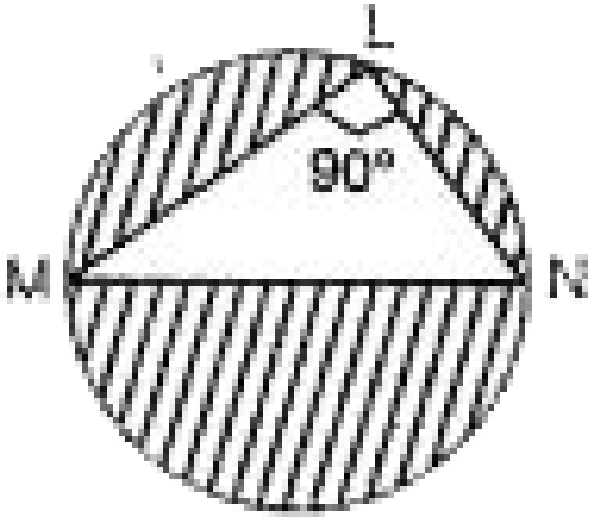
30. In the given figure, $MN = x$ and $LN = \frac{x}{2}$.

What is the area of the shaded region?



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Self Assessment Sheet 22

1. A horse is tied to a pole fixed at one corner of a $50m \times 50m$ square field of grass by means of a 20 m long rope. What is the area to the nearest whole number of that part of the field which the horse can graze?

A. $1256m^2$

B. $942m^2$

C. $628m^2$

D. $314m^2$

Answer: D

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2. From a rectangular metal sheet of sides 25 cm and 20 cm, a circular sheet as large as possible is cut off. What is the area of the remaining sheet ? $(\pi = 3.14)$

A. $186cm^2$

B. $144cm^2$

C. $93cm^2$

D. $72cm^2$

Answer: A

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3. A circle and a rectangle have the same perimeter.The sides of the rectangle are 18 cm and 26 cm. What is the area of the circle ?

A. $88cm^2$

B. $154cm^2$

C. $616cm^2$

D. $1250cm^2$

Answer: C

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4. The area of a circle is $24.64m^2$. The circumference of the circle is

A. 14.64 m

B. 16.36 m

C. 17.60 m

D. 18.40 m

Answer: C

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

A. $49cm^2$

B. $154cm^2$

C. $378cm^2$

D. $1078cm^2$

Answer: B

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6. The perimeter of a circular field and a square field are equal. If the area of the square field is 12100 m2, the area of the circular field

will be (a) 15200m2 (b) 15300m2 (c) 15400m2 (d) 15500m2

A. $15500m^2$

B. $15400m^2$

C. $15200m^2$

D. $15300m^2$

Answer: B

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7. A circular disc of area $(0.49\pi)m^2$ rolls down a length of 1 76 km. The number of revolutions it makes, is :

A. 300

B. 400

C. 600

D. 4000

Answer: B

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8. To make a marriage tent, poles are planted along the perimeter of a square field at a distance of 5 metres from each other and the total number of poles used is 20. What is the area (in sq metres) of the square field ?

A. 500

B. 400

C. 900

D. None of these

Answer: D

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9. A race track is in the form of a ring whose inner circumference is 352 m, and the outer circumference is 396 m. Find the width of the track.

A. 44 m

B. 14 m

C. 22 m

D. 7 m

Answer: D

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10. A wire when bent in the form of an equilateral triangle encloses an area of $121\sqrt{3}cm^2$. If the same wire is bent into the form of a circle, what will be the area of the circle? [Take $\pi = \frac{22}{7}$]

A. $121cm^2$

B. $342cm^2$

C. $346.5cm^2$

D. $154.8m^2$

Answer: C

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