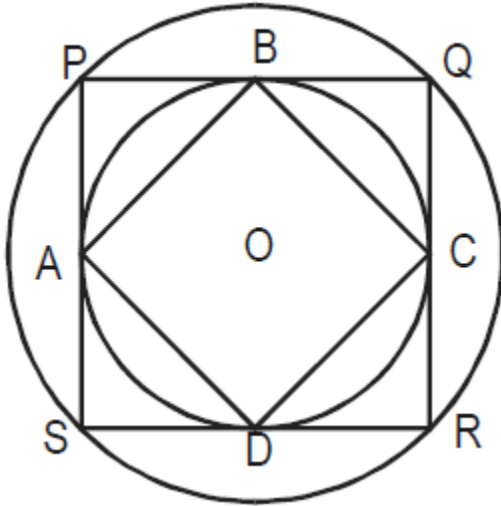**Question: 1**

The figure below shows two concentric circles with centre O. PQRS is a square inscribed in the outer circle. It also circumscribes the inner circle, touching it at points B, C, D and A. What is the ratio of the perimeter of the outer circle to that of polygon ABCD?

Options:

1. $\dfrac{\pi}{4}$

2. $\dfrac{3\pi}{2}$

3. $\dfrac{\pi}{2}$

4. π

Level: Moderate

Topic: Circles

Question: 2

What is the number of distinct triangles with integral valued sides and perimeter 14?
Options:

1. 6
2. 5
3. 4
4. 3

Level: Moderate

Topic: Triangles

Question: 3
ABCD is a rhombus with the diagonals AC and BD intersecting at the origin on the x-y plane. The equation of the straight line AD is x + y = 1. What is the equation of BC?
Options:

1. x + y = −1
2. x − y = −1
3. x + y = 1
4. None of these

Level: Moderate

Topic: Coordinate

Question: 4
Consider a circle with unit radius. There are seven adjacent sectors, S_1, S_2, S_3, ..., S_7, in the circle such that their total area is $\frac{1}{8}$ of the area of the circle. Further, the area of the jth sector is twice that of the $(j − 1)^{th}$ sector, for j = 2, ..., 7. What is the angle, in radians, subtended by the arc of S_1 at the centre of the circle?
Options:

1. $\dfrac{\pi}{508}$
2. $\dfrac{\pi}{2040}$
3. $\dfrac{\pi}{1016}$
4. $\dfrac{\pi}{1524}$

Level: Moderate

Topic: Circles

Question: 5
If a, b and c are the sides of a triangle, and $a^2 + b^2 + c^2 = bc + ca + ab$, then the triangle is
Options:

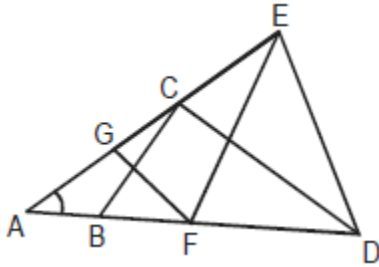1. Equilateral
2. Isosceles
3. right-angled
4. obtuse-angled

Level: Moderate

Topic: Triangles

Question: 6

In the figure above, AB = BC = CD = DE = EF = FG = GA. Then ∠DAE is approximately

Options:

1. 15°
2. 20°
3. 30°
4. 25°

Level: Difficult

Topic: Triangles

Question: 7

A farmer has decided to build a wire fence along one straight side of his property. For this, he planned to place several fence-posts at 6 m intervals, with posts fixed at both ends of the side. After he bought the posts and wire, he found that the number of posts he had bought was 5 less than required. However, he discovered that the number of posts he had bought would be just sufficient if he spaced them 8 m apart. What is the length of the side of his property and how many posts did he buy?

Options:

1. 100 m, 15
2. 100 m, 16
3. 120 m, 15
4. 120 m, 16

Level: Moderate

Topic: Quadrilaterals

Question: 8

A square, whose side is 2 m, has its corners cut away so as to form an octagon with all sides equal. Then the length of each side of the octagon, in meters, is

Options:

1. $\dfrac{\sqrt{2}}{\sqrt{2}+1}$

2. $\dfrac{2}{\sqrt{2}+1}$

3. $\dfrac{2}{\sqrt{2}-1}$

4. $\dfrac{\sqrt{2}}{\sqrt{2}-1}$

Level: Moderate

Topic: Polygons

Question: 9
A certain city has a circular wall around it, and this wall has four gates pointing north, south, east and west. A house stands outside the city, 3 km north of the north gate, and it can just be seen from a point 9 km east of the south gate. What is the diameter of the wall that surrounds the city?
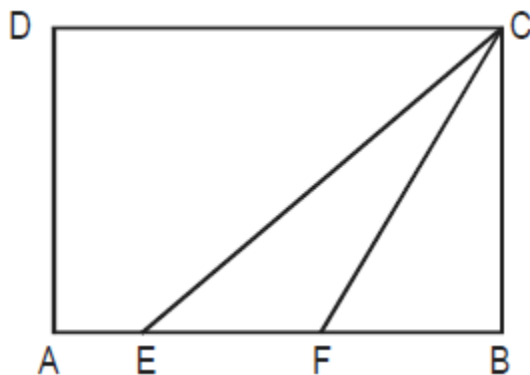**Options:**

1. 6 km
2. 9 km
3. 12 km
4. None of these

Level: Easy

Topic: Basics

Question: 10
In the above diagram, ABCD is a rectangle with AE = EF = FB. What is the ratio of the areas of $\triangle CEF$ and that of the rectangle?

Options:

1. $\dfrac{1}{6}$

2. $\dfrac{1}{8}$

3. $\dfrac{1}{9}$

4. None of these

Level: Easy

Topic: Triangles

Question: 11

A ladder leans against a vertical wall. The top of the ladder is 8 m above the ground. When the bottom of the ladder is moved 2 m farther away from the wall, the top of the ladder rests against the foot of the wall. What is the length of the ladder?
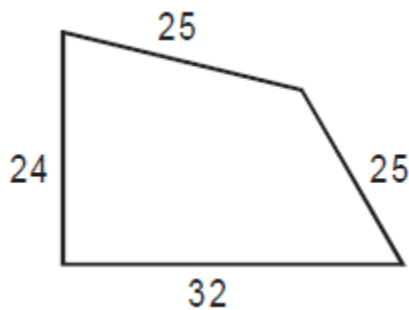
Options:

1. 10 m
2. 15 m
3. 20 m
4. 17 m

Level: Easy

Topic: Triangles

Question: 12

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

What is the area of the plot?

Options:

1. 768 m²
2. 534 m²
3. 696.5 m²
4. 684 m²

Level: Moderate

Topic: Triangles

Question: 13
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?
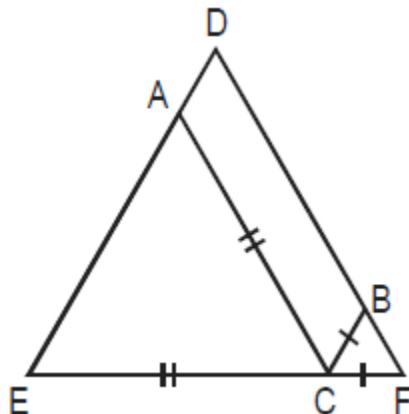**Options:**

1. $\sqrt{260}$
2. $\sqrt{250}$
3. $\sqrt{270}$
4. $\sqrt{270}$

Level: Moderate

Topic: Triangles

Question: 14
In triangle DEF shown below, points A, B and C are taken on DE, DF and EF respectively such that EC = AC and CF = BC. If ∠D=40⁰, then ∠ACB =
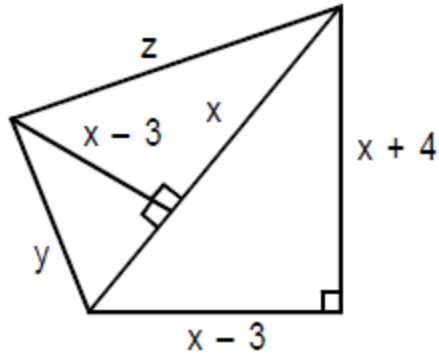

Options:

1. 140
2. 70
3. 100
4. None of these

Level: Moderate

Topic: Triangles

Question: 15
Based on the figure below, what is the value of x, if y = 10?

Options:

1. 10
2. 11
3. 12
4. None of these

Level: Moderate

Topic: Triangles

Question: 16

A rectangular pool 20 m wide and 60 m long is surrounded by a walkway of uniform width. If the total area of the walkway is 516m^2, how wide, in metres, is the walkway?

Options:

1. 43 m
2. 4.3m
3. 3 m
4. 3.5 m

Level: Moderate

Topic: Quadrilaterals

Question: 17

In $\triangle ABC$, the internal bisector of $\angle A$ meets BC at D. If $AB = 4, AC = 3 \text{ and } \angle A = 60°$, then the length of AD is

Options:

1. $2\sqrt{3}$

2. $\dfrac{12\sqrt{3}}{7}$

3. $\dfrac{15\sqrt{3}}{8}$

4. $\dfrac{6\sqrt{3}}{7}$

Level: Moderate

Topic: Triangles

Question: 18
The length of the common chord of two circles of radii 15 cm and 20 cm, whose centres are 25 cm apart, is
Options:

1. 24 cm
2. 25 cm
3. 15 cm
4. 20 cm

Level: Easy

Topic: Circles

Question: 19
Four horses are tethered at four corners of a square plot of side 14 m so that the adjacent horses can just reach one another. There is a small circular pond of area 20 m² at the centre. Find the ungrazed area.
Options:

1. 22 m²
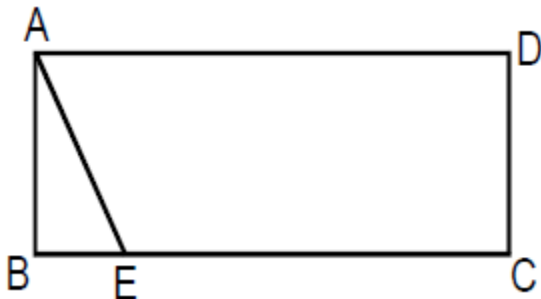2. 42 m²
3. 84 m²
4. 168 m²

Level: Moderate

Topic: Quadrilaterals

Question: 20
In the figure given below, ABCD is a rectangle. The area of the isosceles right triangle

ABE = 7cm²; EC = 3(BE). The area of ABCD (in cm²) is

Options:

1. 21 cm2
2. 28 cm2
3. 42 cm2
4. 56 cm2

Level: Easy

Topic: Triangles

Question: 21
The area of the triangle whose vertices are (a, a), (a + 1, a + 1) and (a + 2, a) is
Options:

1. a^3
2. 1
3. $2a$
4. $2^{1/2}$

Level: Moderate

Topic: Coordinate

Question: 22
Instead of walking along two adjacent sides of a rectangular field, a boy took a short cut along the diagonal and saved a distance equal to half the longer side. Then the ratio of the shorter side to the longer side is
Options:

1. $\dfrac{1}{2}$
2. $\dfrac{2}{3}$
3. $\dfrac{1}{4}$
4. $\dfrac{3}{4}$

Level: Easy

Topic: Triangles

Question: 23
Neeraj has agreed to mow a lawn, which is a 20 m × 40 m rectangle. He mows it with 1 m wide strip. If Neeraj starts at one corner and mows around the lawn toward the

centre, about how many times would he go round before he has mowed half the lawn?
Options:

1. 2.5
2. 3.5
3. 3.8
4. 4

Level: Moderate

Topic: Quadrilaterals

Question: 24
Ten straight lines, no two of which are parallel and no three of which pass through any common point, are drawn on a plane. The total number of regions (including finite and infinite regions) into which the plane would be divided by the lines is
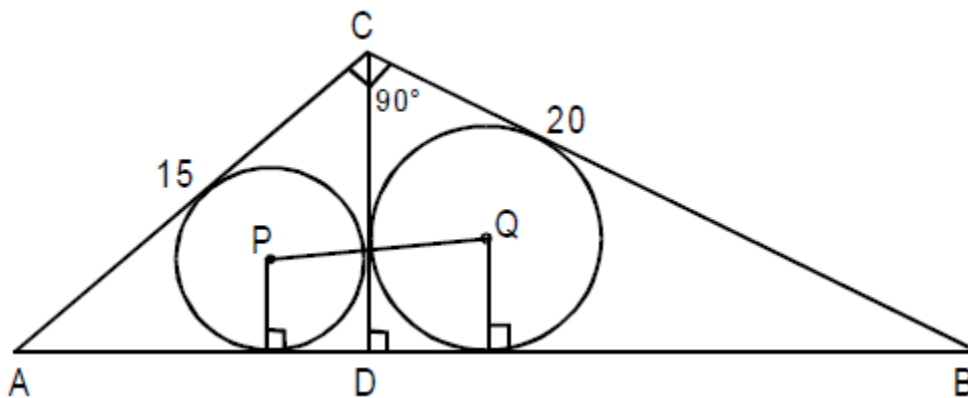**Options:**

1. 56
2. 255
3. 1024
4. Not unique

Level: Difficult

Topic: Basics

Question: 25
In the above figure, ACB is a right-angled triangle. CD is the altitude. Circles are inscribed within the ΔACD and ΔBCD. P and Q are the centres of the circles. The distance PQ is

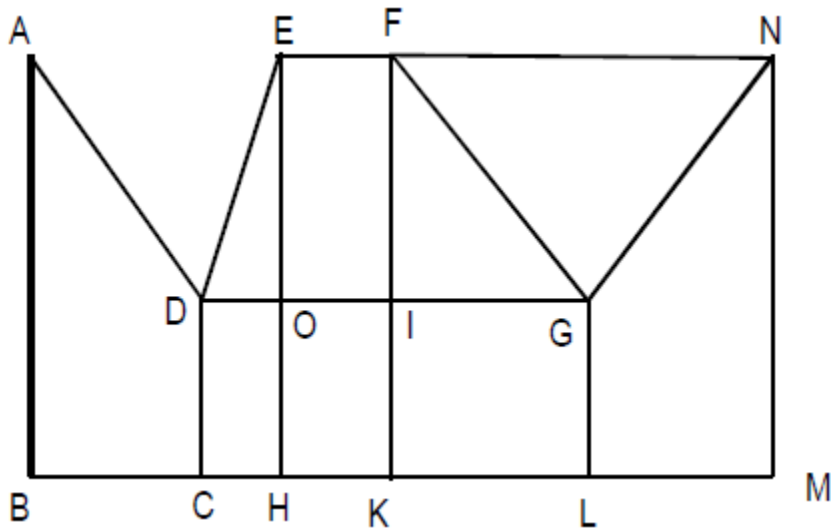

Options:

1. 5
2. $\sqrt{50}$

3. 7
4. 8

Level: Difficult

Topic: Circles

Question: 26
In the above diagram, $\angle ABC = 90^{\circ} = \angle DCH = \angle DOE = \angle EHK = \angle FKL = \angle GLM = \angle LMN$
AB = BC = 2CH = 2CD = EH = FK = 2HK = 4KL = 2LM = MN

The magnitude of ∠FGO =

Options:

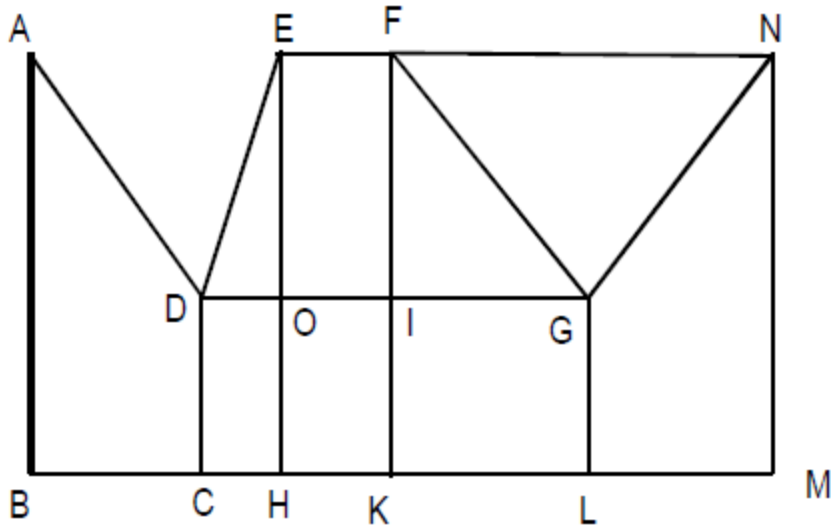1. 30°
2. 45°
3. 60°
4. None of these

Level: Moderate

Topic: Triangles

Question: 27
In the above diagram, $\angle ABC = 90^{\circ} = \angle DCH = \angle DOE = \angle EHK = \angle FKL = \angle GLM = \angle LMN$
AB = BC = 2CH = 2CD = EH = FK = 2HK = 4KL = 2LM = MN

The magnitude of ∠FGO =

What is the ratio of the areas of the two quadrilaterals ABCD to DEFG?

Options:

1. 1:2
2. 2:1
3. 12:7
4. None of these

Level: Moderate

Topic: Quadrilaterals

Question: 28
Let A and B be two solid spheres such that the surface area of B is 300% higher than the surface area of A. The volume of A is found to be k% lower than the volume of B. The value of k must be
Options:

1. 85.5
2. 92.5
3. 90.5
4. 87.5

Level: Moderate

Topic: Solid

Question: 29
A city has two perfectly circular and concentric ring roads, the outer ring road (OR) being twice as long as the inner ring road (IR). There are also four (straight line) chord

roads from E1, the east end point of OR to N2, the north end point of IR; from N1, the north end point of OR to W2, the west end point of IR; from W1, the west end point of OR, to S2, the south end point of IR; and from S1 the south end point of OR to E2, the east end point of IR. Traffic moves at a constant speed of 30π km/hr on the OR road, 20π km/hr on the IR road, and 15 5 km/hr on all the chord roads.

The ratio of the sum of the lengths of all chord roads to the length of the outer ring road is

Options:

1. $\sqrt{5}:2$
2. $\sqrt{5}:2\pi$
3. $\sqrt{5}:\pi$
4. None of the above.

Level: Moderate

Topic: Circles

Question: 30
A city has two perfectly circular and concentric ring roads, the outer ring road (OR) being twice as long as the inner ring road (IR). There are also four (straight line) chord roads from E1, the east end point of OR to N2, the north end point of IR; from N1, the north end point of OR to W2, the west end point of IR; from W1, the west end point of OR, to S2, the south end point of IR; and from S1 the south end point of OR to E2, the east end point of IR. Traffic moves at a constant speed of 30π km/hr on the OR road, 20π km/hr on the IR road, and 15 5 km/hr on all the chord roads.

Amit wants to reach N2 from S1. It would take him 90 minutes if he goes on minor arc S1 – E1 on OR, and then on the chord road E1 – N2. What is the radius of the outer ring road in kms?

Options:

1. 60
2. 40
3. 30
4. 20

Level: Moderate

Topic: Circles

Question: 31
A city has two perfectly circular and concentric ring roads, the outer ring road (OR) being twice as long as the inner ring road (IR). There are also four (straight line) chord roads from E1, the east end point of OR to N2, the north end point of IR; from N1, the

north end point of OR to W2, the west end point of IR; from W1, the west end point of OR, to S2, the south end point of IR; and from S1 the south end point of OR to E2, the east end point of IR. Traffic moves at a constant speed of 30π km/hr on the OR road, 20π km/hr on the IR road, and 15 5 km/hr on all the chord roads.

Amit wants to reach E2 from N1 using first the chord N1 – W2 and then the inner ring road. What will be his travel time in minutes on the basis of information given in the above question?

Options:

1. 60
2. 45
3. 90
4. 105

Level: Moderate

Topic: Circles

Question: 32
AB is a chord of a circle. AB = 5 cm. A tangent parallel to AB touches the minor arc AB at E.
What is the radius of the circle?

A. AB is not a diameter of the circle.

B. The distance between AB and the tangent at E is 5 cm.

Options:

1. The question can be answered by one of the statements alone but not by the other.
2. The question can be answered by using either statement alone.
3. The question can be answered by using both the statements together, but cannot be answered by using either statement alone.
4. The question cannot be answered even by using both the statements together.

Level: Easy

Topic: Data Sufficiency

Question: 33
D, E, F are the mid points of the sides AB, BC and CA of triangle ABC respectively.
What is the area of DEF in square centimeters?
A. AD = 1 cm, DF = 1 cm and perimeter of DEF = 3 cm

B. Perimeter of ABC = 6 cm, AB = 2 cm, and AC = 2 cm.

Options:

1. The question can be answered by one of the statements alone but not by the other.
2. The question can be answered by using either statement alone.
3. The question can be answered by using both the statements together, but cannot be answered by using either statement alone.
4. The question cannot be answered even by using both the statements together.

Level: Moderate

Topic: Data Sufficiency

Question: 34
Each side of a given polygon is parallel to either the X or the Y axis. A corner of such a polygon is said to be convex if the internal angle is 90° or concave if the internal angle is 270°. If the number of convex corners in such a polygon is 25, the number of concave corners must be
Options:

1. 20
2. 0
3. 21
4. 22

Level: Moderate

Topic: Polygons

Question: 35
There are two concentric circles such that the area of the outer circle is four times the area of the inner circle. Let A, B and C be three distinct points on the perimeter of the outer circle such that AB and AC are tangents to the inner circle. If the area of the outer circle is 12 square centimeters then the area (in square centimeters) of the triangle ABC would be
Options:

1. $\pi\sqrt{12}$
2. $\dfrac{9}{\pi}$
3. $\dfrac{9\sqrt{3}}{\pi}$
4. $\dfrac{6\sqrt{3}}{\pi}$

Level: Moderate

Topic: Circles

Question: 36

Three horses are grazing within a semi-circular field. In the diagram given below, AB is the diameter of the semi-circular field with center at O. Horses are tied up at P, R and S such that PO and RO are the radii of semi-circles with centers at P and R respectively, and S is the center of the circle touching the two semi-circles with diameters AO and OB. The horses tied at P and R can graze within the respective semi-circles and the horse tied at S can graze within the circle centred at S. The percentage of the area of the semi-circle with diameter AB that cannot be grazed by the horses is nearest to
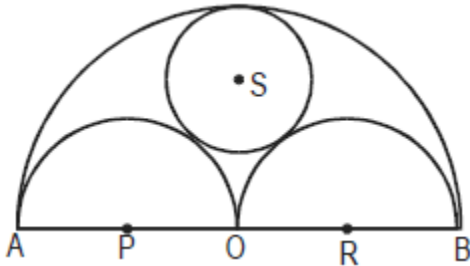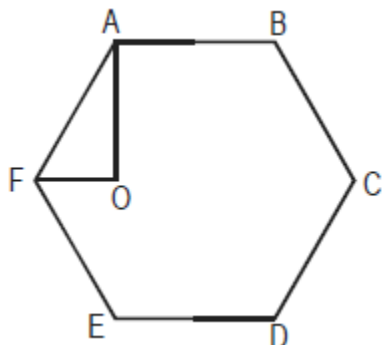

Options:

    1. 20
    2. 28
    3. 36
    4. 40

Level: Difficult

Topic: Circles

Question: 37

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

Options:

1. $\dfrac{1}{12}$

2. $\dfrac{1}{6}$

3. $\dfrac{1}{24}$

4. $\dfrac{1}{18}$

Level: Easy

Topic: Polygons

Question: 38
A vertical tower OP stands at the center O of a square ABCD. Let h and b denote the length OP and AB respectively. Suppose ∠APB = 60° then the relationship between h and b can be expressed as
Options:

1. $2b^2 = h^2$
2. $2h^2 = b^2$
3. $3b^2 = 2h^2$
4. $3h^2 = 2b^2$

Level: Moderate

Topic: Triangles

Question: 39
In the triangle ABC, AB = 6, BC = 8 and AC = 10. A perpendicular dropped from B, meets the side AC at D. A circle of radius BD (with center B) is drawn. If the circle cuts AB and BC at P and Q respectively, the AP:QC is equal to
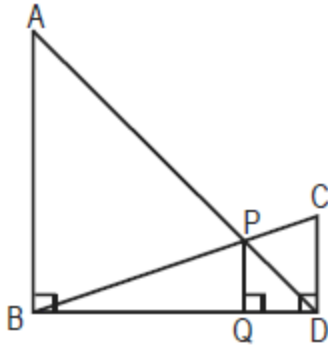**Options:**

1. 1:1
2. 3:2
3. 4:1
4. 3:8

Level: Difficult

Topic: Circles

Question: 40
In the diagram given below, ∠ABD = ∠CDB = ∠PQD = 90° . If AB:CD = 3:1, the ratio of CD: PQ is
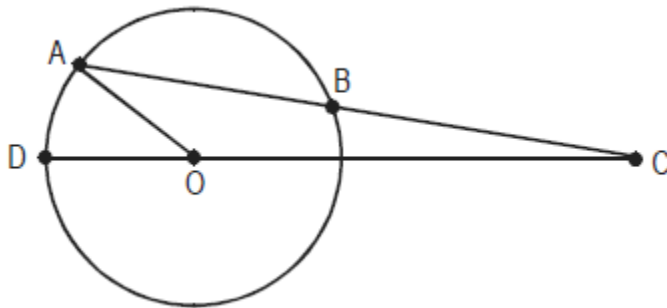
Options:

1. 1:0.69
2. 1:0.75
3. 1:0.72
4. None of the above

Level: Difficult

Topic: Triangles

Question: 41

In the figure below, AB is the chord of a circle with center O. AB is extended to C such that BC = OB. The straight line CO is produced to meet the circle at D. If ∠ACD = y degrees and ∠AOD = x degrees such that x = ky, then the value of k is
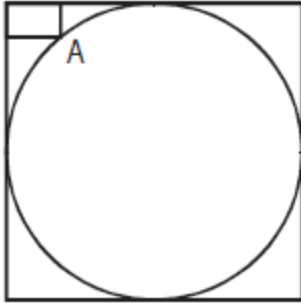

Options:

1. 3
2. 2
3. 1
4. None of the above

Level: Moderate

Topic: Circles

Question: 42
In the figure below, the rectangle at the corner measures 10 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?
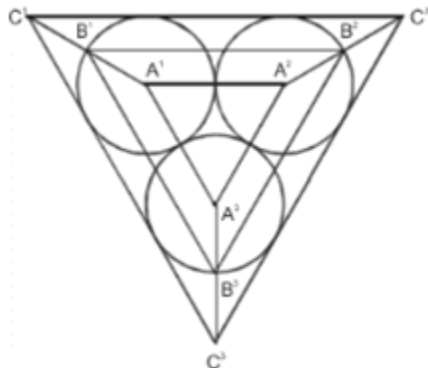

Options:

1. 10 cm
2. 40 cm
3. 50 cm
4. None of the above

Level: Moderate

Topic: Circles

Question: 43
Consider three circular parks of equal size with centers at A^1, A^2, and A^3 respectively. The parks touch each other at the edge as shown in the figure (not drawn to scale). There are three paths formed by the triangles $A^1A^2A^3$, $B^1B^2B^3$, and $C^1C^2C^3$, , as shown. Three sprinters A, B, and C begin running from points A^1, B^1 and C^1 respectively. Each sprinter traverses her respective triangular path clockwise and returns to her starting point.

Let the radius of each circular park be r, and the distances to be traversed by the sprinters A, B and C be a, b and c respectively. Which of the following is true?
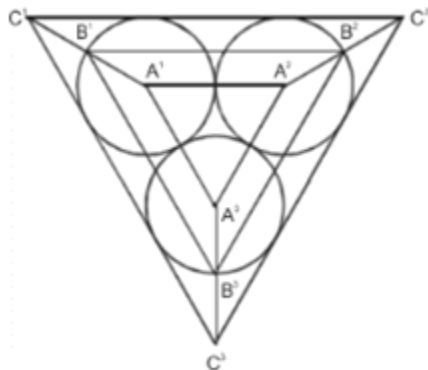
Options:

1. $b - a = c - b = 3\sqrt{3}r$
2. $b - a = c - b = \sqrt{3}r$
3. $b = \dfrac{a+c}{2} = 2\left(1+\sqrt{3}\right)r$
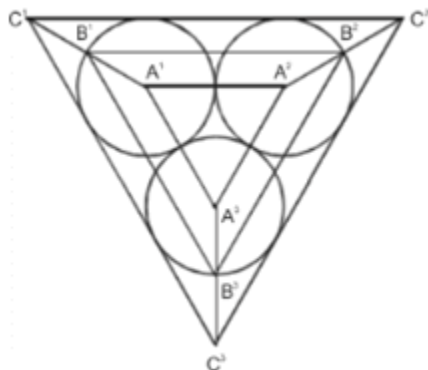4. $c = 2b - a = \left(2+\sqrt{3}\right)r$

Level: Easy

Topic: triangles

Question: 44
Consider three circular parks of equal size with centers at A^1, A^2, and A^3 respectively. The parks touch each other at the edge as shown in the figure (not drawn to scale). There are three paths formed by the triangles $A^1A^2A^3$, $B^1B^2B^3$, and $C^1C^2C^3$, , as shown. Three sprinters A, B, and C begin running from points A^1, B^1 and C^1respectively. Each sprinter traverses her respective triangular path clockwise and returns to her starting point.

Let the radius of each circular park be r, and the distances to be traversed by the sprinters A, B and C be a, b and c respectively. Which of the following is true?

Sprinter A traverses distances A1A2, A2A3, and A3A1 at an average speed of 20, 30 and 15 respectively. B traverses her entire path at a uniform speed of $\left(10\sqrt{3}+20\right)$. C traverses distances C1C2, C2C3 and C3C1 at an average speeds of

$\frac{40}{3}\left(\sqrt{3}+1\right), \frac{40}{3}\left(\sqrt{3}+1\right)$ and 120 respectively. All speeds are in the same unit. Where would B and C be respectively when A finishes her sprint?

Options:

1. B1, C1
2. B3, C
3. B1, C3
4. B1, Somewhere between C3 and C1

Level: Difficult

Topic: triangles

Question: 45
Consider three circular parks of equal size with centers at A1, A2, and A3 respectively. The parks touch each other at the edge as shown in the figure (not drawn to scale). There are three paths formed by the triangles A1A2A3, B1B2B3, and C1C2C3, as shown. Three sprinters A, B, and C begin running from points A1, B1 and C1 respectively. Each sprinter traverses her respective triangular path clockwise and returns to her starting point.
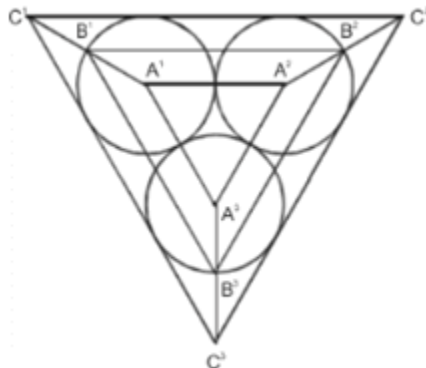
Sprinters A, B and C traverse their respective paths at uniform speeds of u, v and w respectively. It is known that u2:v2:w2 is equal to Area A: Area B: Area C, where Area A, Area B and Area C are the areas of triangles A1A2A3, B1B2B3, and C1C2C3 respectively. Where would A and C be when B reaches point B3?

Options:

1. A2, C3
2. A3, C3
3. A3, C2
4. Somewhere between A2 and A3, Somewhere between C3 and C1

Level: Difficult

Geometry Questions for CAT Exam

Topic: triangles

Question: 46

Consider a cylinder of height h cm and radius $r = \dfrac{2}{\pi}$ cm as shown in the figure (not drawn to scale). A string of a certain length, when wound on its cylindrical surface, starting at point A and ending at point B, gives a maximum of n turns (in other words, the string's length is the minimum length required to wind n turns).
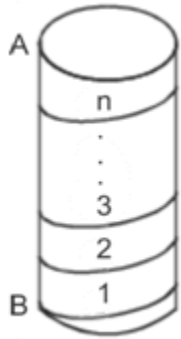
What is the vertical spacing between the two consecutive turns?

Options:

1. $\dfrac{h}{n} cm$

2. $\dfrac{h}{\sqrt{n}} cm$

3. $\dfrac{h}{n^2} cm$

4. Cannot be determined
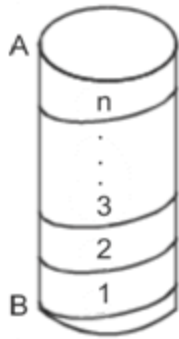
Level: Easy

Topic: solid

Question: 47

Consider a cylinder of height h cm and radius $r = \dfrac{2}{\pi}$ cm as shown in the figure (not drawn to scale). A string of a certain length, when wound on its cylindrical surface, starting at point A and ending at point B, gives a maximum of n turns (in other words, the string's length is the minimum length required to wind n turns).

The same string, when wound on the exterior four walls of a cube of side n cm, starting at point C and ending at point D, can give exactly one turn (see figure, not drawn to scale). The length of the string is

Options:

1. $\sqrt{2}n$ cm
2. $\sqrt{17}n$ cm
3. n cm
4. $\sqrt{13}n$ cm

Level: Difficult

Topic: Solid Geometry

Question: 48

Consider a cylinder of height h cm and radius $r = \dfrac{2}{\pi}$ cm as shown in the figure (not drawn to scale). A string of a certain length, when wound on its cylindrical surface, starting at point A and ending at point B, gives a maximum of n turns (in other words, the string's length is the minimum length required to wind n turns).
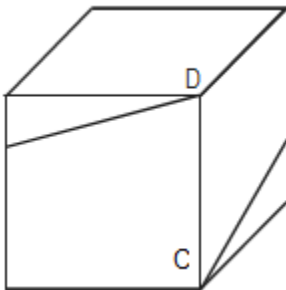
In the set-up of the previous two questions, how is h related to n

Options:

1. $h = \sqrt{2}n$
2. $h = \sqrt{17}n$
3. $h = n$
4. $h = \sqrt{13}n$

Level: Moderate

Topic: solid

Question: 49

In the figure (not drawn to scale) given below, P is a point on AB such that AP : PB = 4 : 3. PQ is parallel to AC and QD is parallel to CP. In $\triangle ARC$, $\angle ARC = 90^o$ and in $\triangle PQS$, $\angle PSQ = 90^o$ The length of QS is 6 cm. What is the ratio of AP : PD?
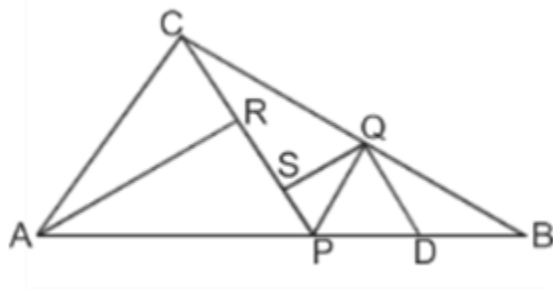
Options:

1. 10:3
2. 2:1
3. 7:3
4. 8:3

Level: Difficult

Topic: triangles

Question: 50

A car is being driven, in a straight line and at a uniform speed, towards the base of a vertical tower. The top of the tower is observed from the car and, in the process, it takes 10 min for the angle of elevation to change from 45° to 60°. After how much more time will this car reach the base of the tower?
Options:

1. $5\left(\sqrt{3} + 1\right)$
2. $6\left(\sqrt{3} + \sqrt{2}\right)$
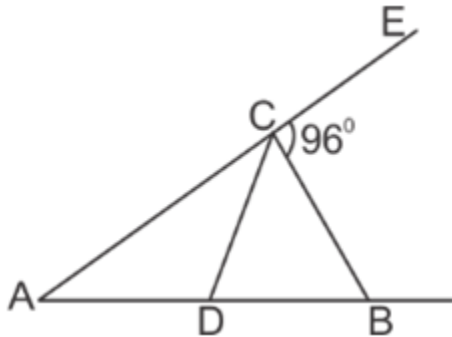3. $7\left(\sqrt{3} - 1\right)$

4. $8\left(\sqrt{3}-2\right)$

Level: Moderate

Topic: trignometry

Question: 51

In the figure (not drawn to scale) given below, if AD = CD = BC and ∠BCE =96⁰ , how much is the value of ∠DBC?

Options:

1. 32°
2. 84°
3. 64°
4. Cannot be determined

Level: Easy

Topic: triangles

Question: 52

Consider two different cloth-cutting processes. In the first one, n circular cloth pieces are cut from square cloth piece of side *a* in the following steps: the original square of side *a* is divided into *n* smaller squares, not necessarily of the same size, then a circle of maximum possible area is cut from each of the smaller squares. In the second process, only one circle of maximum possible area is cut from the square of side *a* and the process ends there. The cloth pieces remaining after cutting the circles are scrapped in both the processes. The ratio of the total area of scrap cloth generated in the former to that in the latter is

Options:

1. 1:1
2. $\sqrt{2}:1$
3. $\dfrac{n\left(4-\pi\right)}{4n-\pi}$

4. $\dfrac{4n - \pi}{(4 - \pi)}$

Level: Moderate

Topic: circle

Question: 53

In the figure below (not drawn to scale), rectangle ABCD is inscribed in the circle with centre at O. The length of side AB is greater than side BC. The ratio of the area of the circle to the area of the rectangle ABCD is $\pi : \sqrt{3}$. The line segment DE intersects AB at E such that ∠ODC =∠ The ratio AE : AD is
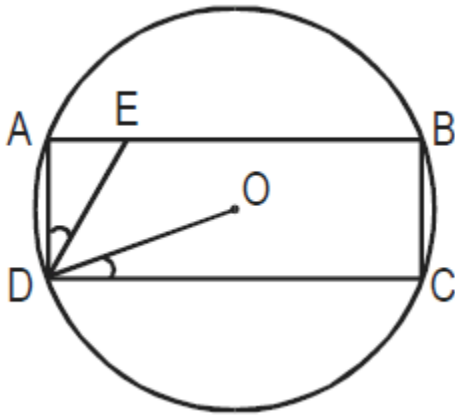
Options:

1. $1 : \sqrt{3}$
2. $1 : \sqrt{2}$
3. $1 : 2\sqrt{3}$
4. 1:2

Level: Moderate

Topic: circle

Question: 54

The length of the circumference of a circle equals the perimeter of a triangle of equal sides, and also the perimeter of a square. The areas covered by the circle, triangle, and square are c, t and s, respectively. Then,
Options:

1. s > t > c
2. c > t > s
3. c > s > t
4. s > c > t

Level: Easy

Topic: Basics

Question: 55
The chord BA is extended to a point T such that CT becomes a tangent to the circle at point
If ∠ATC = 30° and ∠ACT = 50°, then the angle ∠BOA is
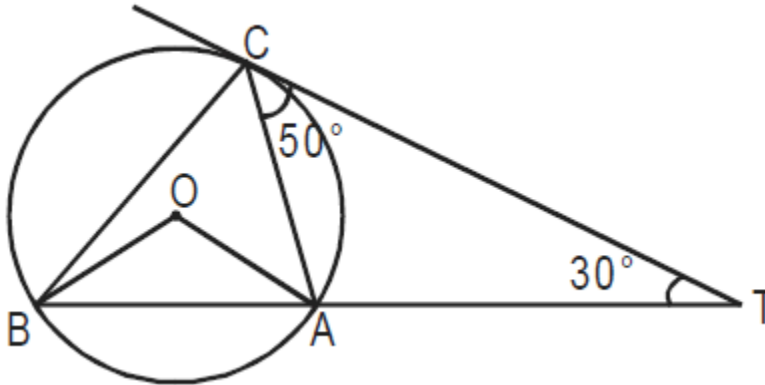
Options:

1. 100°
2. 150°
3. 80°
4. not possible to determine

Level: Easy

Topic: Circles

Question: 56
Let ABCDEF be a regular hexagon. What is the ratio of the area of the ΔACE to that of the hexagon ABCDEF?
Options:

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

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

3. $\dfrac{2}{3}$

4. $\dfrac{5}{6}$

Level: Easy

Geometry Questions for CAT Exam

Topic: Polygons

Question: 57
A piece of paper is in the shape of a right-angled triangle and is cut along a line that is parallel to the hypotenuse, leaving a smaller triangle. There was 35% reduction in the length of the hypotenuse of the triangle. If the area of the original triangle was 34 square inches before the cut, what is the area (in square inches) of the smaller triangle?
Options:

1. 665
2. 565
3. 465
4. 365

Level: Easy

Topic: Triangles

Question: 58
A square tin sheet of side 12 inches is converted into a box with open top in the following steps. The sheet is placed horizontally. Then, equal-sized squares, each of side x inches, are cut from the four corners of the sheet. Finally, the four resulting sides are bent vertically upwards in the shape of a box. If x is an integer, then what value of x maximizes the volume of the box?
Options:

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

Level: Moderate

Topic: Solid

Question: 59
A rectangular sheet of paper, when halved by folding it at the mid point of its longer side, results in a rectangle, whose longer and shorter sides are in the same proportion as the longer and shorter sides of the original rectangle. If the shorter side of the original rectangle is 2, what is the area of the smaller rectangle?
Options:

1. $4\sqrt{2}$
2. $2\sqrt{2}$
3. $\sqrt{2}$
4. None of these

Level: Moderate

Topic: Quadrilaterals

Question: 60
In the adjoining figure I and II, are circles with P and Q respectively, The two circles touch each other and have common tangent that touches them at points R and S respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the ratio 4 : 3. It is also known that the length of PO is 28 cm.
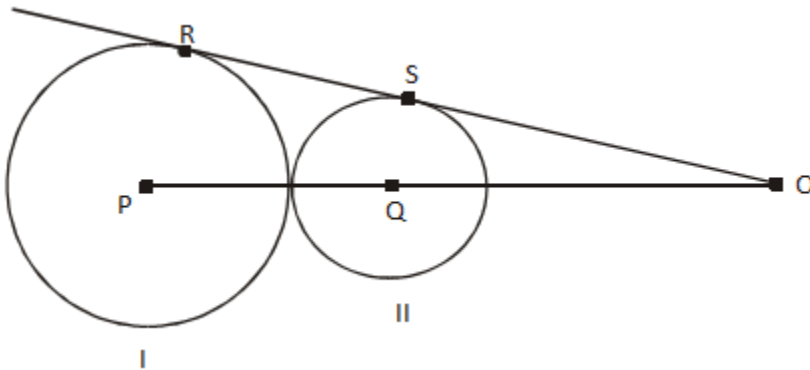
What is the ratio of the length of PQ to that of QO?

Options:

1. 1:4
2. 1:3
3. 3:8
4. 3:4

Level: Easy

Topic: Circles

Question: 61
In the adjoining figure I and II, are circles with P and Q respectively, The two circles touch each other and have common tangent that touches them at points R and S respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the ratio 4 : 3. It is also known that the length of PO is 28 cm.

What is the radius of the circle II?

Options:

1. 2 cm
2. 3 cm
3. 4 cm
4. 5 cm
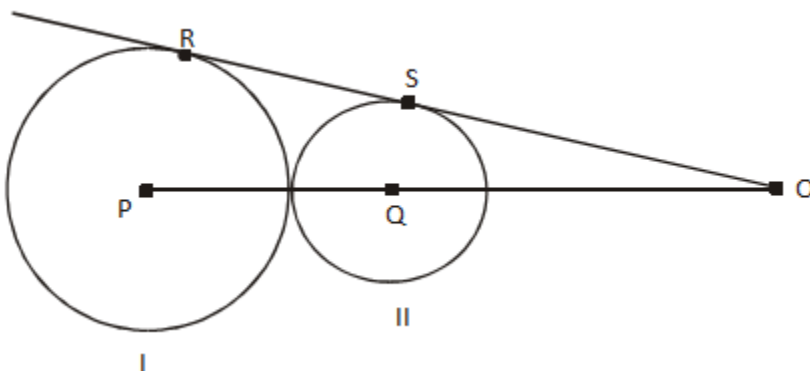
Level: Easy

Topic: Circles

Question: 62
In the adjoining figure I and II, are circles with P and Q respectively, The two circles touch each other and have common tangent that touches them at points R and S respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the ratio 4 : 3. It is also known that the length of PO is 28 cm.
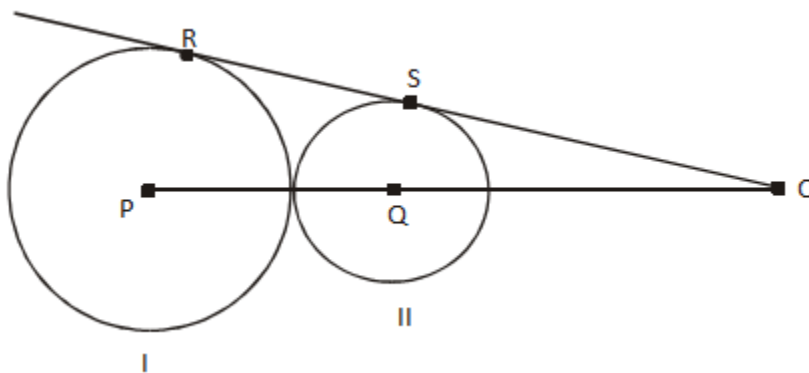
The length of SO is

Options:

1. $8\sqrt{3}\ cm$
2. $10\sqrt{3}\ cm$
3. $12\sqrt{3}\ cm$
4. $14\sqrt{3}\ cm$

Level: Easy

Topic: Circles

Question: 63
Let C be a circle with centre P_0 and AB be a diameter of C. Suppose P_1 is the midpoint of the line segment P_0B, P_2 is the midpoint of the line segment P_1B and so on. Let C_1, C_2,

C_3, ... be circles with diameters P_0P_1, P_1P_2, P_2P_3... respectively. Suppose the circles C_1, C_2, C_3, ... are all shaded. The ratio of the area of the unshaded portion of C to that of the original circle is

Options:

1. 8:9
2. 9:10
3. 10:11
4. 11:12

Level: Moderate

Topic: Circles

Question: 64
If the lengths of diagonals DF, AG and CE of the cube shown in the adjoining figure are equal to the three sides of a triangle, then the radius of the circle circumscribing that triangle will be
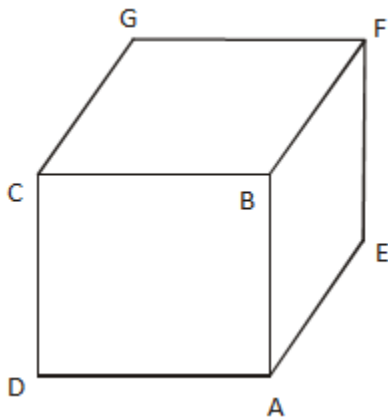
Options:

1. equal to the side of cube
2. $\sqrt{3}$ times the side of the cube
3. $\dfrac{1}{\sqrt{3}}$ times the side of the cube
4. Impossible to find from the given information..

Level: Moderate

Topic: Solid Geometry

Question: 65
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?
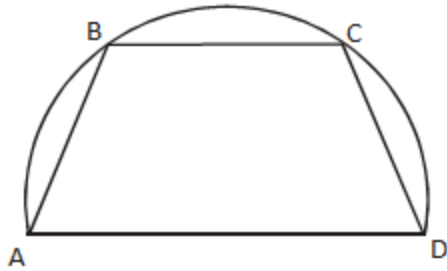
Options:

1. 5
2. 7
3. 75
4. None of the above

Level: Moderate

Topic: Circles

Question: 66

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?
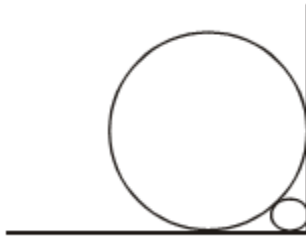
Options:

1. $3 - 2\sqrt{2}$
2. $3 - 2\sqrt{2}$
3. $3 - 2\sqrt{2}$
4. $3 - 2\sqrt{2}$

Level: Moderate

Topic: Circles

Question: 67

In the adjoining figure, chord ED is parallel to the diameter AC of the circle. If ∠ CBE = 65⁰, then what is the value of ∠DEC?
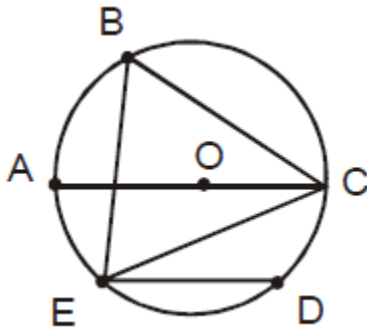
Options:

1. 35°
2. 55°
3. 45°
4. 25°

Level: Easy

Topic: Circles

Question: 68

Two identical circles intersect so that their centers, and the points at which they intersect, form a square of side 1 cm. The area in sq. cm of the portion that is common to the two circles is

Options:

1. $\dfrac{\pi}{4}$

2. $\dfrac{\pi}{4} - 1$

3. $\dfrac{\pi}{5}$

4. $\sqrt{2} - 1$

Level: Moderate

Topic: Circles

Question: 69

What is the distance in cm between two parallel chords of lengths 32 cm and 24 cm in a circle of radius 20 cm?

Options:

1. 1 or 7
2. 2 or 14
3. 3 or 21
4. 4 or 28

Level: Easy

Topic: Circles

Question: 70

Four points A, B, C and D lie on a straight line in the X-Y plane, such that AB = BC = CD, and the length of AB is 1 metre. An ant at A wants to reach a sugar particle at D. But there are insect repellents kept at points B and C. the ant would not go within one metre of any insect repellent. The minimum distance in metres the ant must traverse to reach the sugar particle is

Options:

1. $3\sqrt{2}$
2. $1+\pi$
3. $\dfrac{4\pi}{3}$
4. 5

Level: Moderate

Topic: Circles

Question: 71

Rectangular tiles each of size 70 cm by 30 cm must be laid horizontally on a rectangular floor of size 110 cm by 130 cm, such that the tiles do not overlap. A tile can be placed in any orientation so long as its edges are parallel to the edges of the floor. No tile should overshoot any edge of the floor. The maximum number of tiles that can be accommodated on the floor is

Options:

1. 4
2. 5
3. 6
4. 7

Level: Moderate

Topic: Quadrilaterals

Question: 72

In the following figure, the diameter of the circle is 3 cm. AB and MN are two diameters such that MN is perpendicular to AB. In addition, CG is perpendicular to AB such that AE:EB = 1:2, and DF is perpendicular to MN such that NL:LM = 1:2. The length of DH in cm is
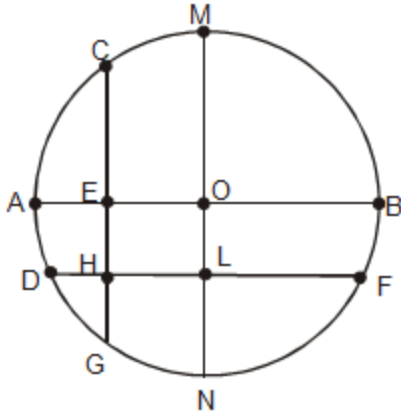
Options:

1. $2\sqrt{2}-1$

2. $\dfrac{\left(2\sqrt{2}-1\right)}{2}$

3. $\dfrac{\left(3\sqrt{2}-1\right)}{2}$

4. $\dfrac{\left(2\sqrt{2}-1\right)}{3}$

Level: Moderate

Topic: Circles

Question: 73
Consider the triangle ABC shown in the following figure where BC = 12 cm, DB = 9 cm, CD = 6 cm and $\angle BCD = \angle BAC$
What is the ratio of the perimeter of $\triangle ADC$ to that of the $\triangle BDC$?
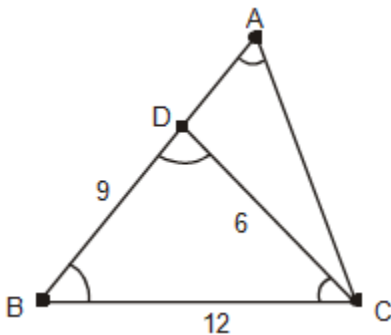
Options:

1. $\dfrac{7}{9}$

2. $\dfrac{8}{9}$

3. $\dfrac{6}{9}$

4. $\dfrac{5}{9}$

Level: Moderate

Topic: Triangles

Question: 74
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?
Options:

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

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

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

4. $2r+\sqrt{3}$

Level: Difficult

Topic: Quadrilaterals

Question: 75
A semi-circle is drawn with AB as its diameter. From C, a point on AB, a line perpendicular to AB is drawn meeting the circumference of the semi-circle at D. Given that AC = 2 cm and CD = 6 cm, the area of the semi-circle (in sq. cm) will be:
Options:

1. 32π
2. 50π
3. 40.5π
4. 81π

Level: Moderate

Topic: Circles

Question: 76
A punching machine is used to punch a circular hole of diameter two units from a

square sheet of aluminium of width 2 units, as shown below. The hole is punched such that the circular hole touches one corner P of the square sheet and the diameter of the hole originating at P is in line with a diagonal ofthe square.
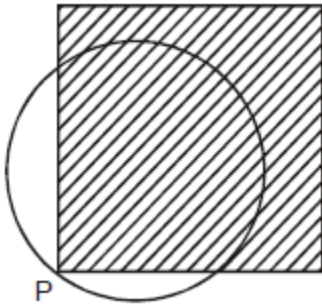
The proportion of the sheet area that remains after punching is:

Options:

1. $\dfrac{(x+2)}{8}$

2. $\dfrac{(6-\pi)}{8}$

3. $\dfrac{(4-\pi)}{4}$

4. $\dfrac{(x-2)}{4}$

Level: Moderate

Topic: Circles

Question: 77
An equilateral triangle BPC is drawn inside a square ABCD. What is the value of the angle APD in degrees?
Options:

1. 75
2. 90
3. 120
4. 135

Level: Moderate

Topic: Triangles

Question: 78
The question is followed by two statements A and B. Indicate your response based on the following directives.
ABC Corporation is required to maintain at least 400 Kilolitres of water at all times in its factory, in order to meet safety and regulatory requirements. ABC is considering the suitability of a spherical tank with uniform wall thickness for the purpose. The outer diameter of the tank is 10 meters. Is the tank capacity adequate to met ABC's requirements?

A: The inner diameter of the tank is at least 8 meters.

B: The tank weights 30,000 kg when empty, and is made of a material with density of 3 gm/cc.

Options:

1. The questions can be answered using A alone but not using B alone.
2. The question can be answered using B alone but not using A alone.
3. The question can be answered using A and B together, but not using either A or B alone.
4. The question cannot be answered even using A and B together

Level: Moderate

Topic: DS

Question: 79
The question is followed by two statements A and B. Indicate your response based on the following directives.
Rahim plans to draw a square JKLM with point O on the side JK but is not successful. Why is Rahim unable to draw the square?

A: The length of OM is twice that of OL.

B: The length of OM is 4 cm.

Options:

1. The questions can be answered using A alone but not using B alone.
2. The question can be answered using B alone but not using A alone.
3. The question can be answered using A and B together, but not using either A or B alone.
4. The question cannot be answered even using A and B together

Level: Moderate

Topic: DS

Question: 80
Two circles with centres P and Q cut each other at two distinct points A and B. The circles have the same radii and neither P nor Q falls within the intersection of the circles. What is the smallest range that includes all possible values of the angle AQP in degrees?
Options:

1. Between 0 and 90
2. Between 0 and 30
3. Between 0 and 60
4. Between 0 and 75

Level: Moderate

Topic: Circles

Question: 81
In a triangle ABC, the lengths of the sides AB and AC equal 17.5 cm and 9 cm respectively. Let D be a point on the line segment BC such that AD is perpendicular to BC. If AD = 3 cm, then what is the radius (in cm) of the circle circumscribing the triangle ABC?
Options:

1. 5
2. 85
3. 45
4. 25

Level: Easy

Topic: Triangles

Question: 82
Consider obtuse-angled triangles with sides 8 cm, 15 cm and x cm. If x is an integer, then how many such triangles exist?
Options:

1. 5
2. 21
3. 10
4. 15

Level: Moderate

Topic: Triangles

Question: 83
Consider a square ABCD with midpoints E, F, G, H of AB, BC, CD and DA respectively. Let L denote the line passing through F and H. Consider points P and Q, on L and

inside ABCD, such that the angles APD and BQC both equal 120°. What is the ratio of the area of ABQCDP to the remaining area inside ABCD?
Options:

1. $\dfrac{4\sqrt{2}}{3}$
2. $2+\sqrt{3}$
3. $\dfrac{10-3\sqrt{2}}{9}$
4. $1+\dfrac{1}{\sqrt{3}}$

Level: Difficult

Topic: Quadrilaterals

Question: 84
Two circles, both of radii 1 cm, intersect such that the circumference of each one passes through the centre of the other. What is the area (in sq. cm.) of the intersecting region?
Options:

1. $\dfrac{\pi}{3}-\dfrac{\sqrt{3}}{4}$
2. $\dfrac{2\pi}{3}-\dfrac{\sqrt{3}}{2}$
3. $\dfrac{4\pi}{3}-\dfrac{\sqrt{3}}{2}$
4. $\dfrac{4\pi}{3}+\dfrac{\sqrt{3}}{4}$

Level: Moderate

Topic: Circles

Question: 85
Consider a right circular cone of base radius 4 cm and height 10 cm. A cylinder is to be placed inside the cone with one of the flat surfaces resting on the base of the cone. Find the largest possible total surface area (in sq. cm) of the cylinder.
Options:

1. $\dfrac{100\pi}{3}$

2. $\dfrac{80\pi}{3}$

3. $\dfrac{120\pi}{7}$

4. $\dfrac{130\pi}{9}$

Level: Difficult

Topic: Solid Geometry.

Answer Keys

Ques 1	**3**	Ques 21	**2**	Ques 41	**1**	Ques 61	**2**	Ques 81	**5**
Ques 2	**3**	Ques 22	**4**	Ques 42	**3**	Ques 62	**3**	Ques 82	**3**
Ques 3	**1**	Ques 23	**3**	Ques 43	**1**	Ques 63	**4**	Ques 83	**5**
Ques 4	**3**	Ques 24	**1**	Ques 44	**3**	Ques 64	**1**	Ques 84	**5**
Ques 5	**1**	Ques 25	**2**	Ques 45	**2**	Ques 65	**2**	Ques 85	**1**
Ques 6	**4**	Ques 26	**4**	Ques 46	**1**	Ques 66	**4**		
Ques 7	**4**	Ques 27	**3**	Ques 47	**2**	Ques 67	**4**		
Ques 8	**2**	Ques 28	**4**	Ques 48	**3**	Ques 68	**2**		
Ques 9	**2**	Ques 29	**3**	Ques 49	**3**	Ques 69	**4**		
Ques 10	**1**	Ques 30	**3**	Ques 50	**1**	Ques 70	**2**		
Ques 11	**4**	Ques 31	**4**	Ques 51	**3**	Ques 71	**3**		
Ques 12	**4**	Ques 32	**1**	Ques 52	**1**	Ques 72	**2**		
Ques 13	**1**	Ques 33	**2**	Ques 53	**1**	Ques 73	**1**		
Ques 14	**3**	Ques 34	**3**	Ques 54	**3**	Ques 74	**1**		
Ques 15	**2**	Ques 35	**3**	Ques 55	**1**	Ques 75	**2**		
Ques 16	**3**	Ques 36	**2**	Ques 56	**2**	Ques 76	**2**		
Ques 17	**2**	Ques 37	**1**	Ques 57	**4**	Ques 77	**5**		
Ques 18	**1**	Ques 38	**2**	Ques 58	**4**	Ques 78	**2**		
Ques 19	**1**	Ques 39	**4**	Ques 59	**2**	Ques 79	**1**		
Ques 20	**4**	Ques 40	**2**	Ques 60	**2**	Ques 80	**3**		

FREE resources

- **800+Tough Quantitative Aptitude Questions with Solutions**
- **100+ Reading Comprehension passages with Explanations**
- **101 Logical Reasoning Sets with Solutions**
- **YouTube Channel for Theory**

Online CAT Coaching