

CBSE
Class X Mathematics
Board Paper – 2017
All India Set – 3

Time: 3 hours

Total Marks: 90

General Instructions:

- (i) All questions are compulsory.
 - (ii) The question paper consists of 31 questions divided into four sections – A, B, C and D.
 - (iii) Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.
 - (iv) Use of calculators is not permitted.
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SECTION A

Question numbers 1 to 4 carry 1 mark each.

- 1. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap?
- 2. If a tower 30 m high, casts a shadow $10\sqrt{3}$ m long on the ground, then what is the angle of elevation of the sun?
- 3. If the angle between two tangents drawn from an external point P to a circle of radius a and centre O, is 60° , then find the length of OP.
- 4. What is the common difference of an A.P. in which $a_{21} - a_7 = 84$?

SECTION B

Question numbers 5 to 10 carry 2 marks each.

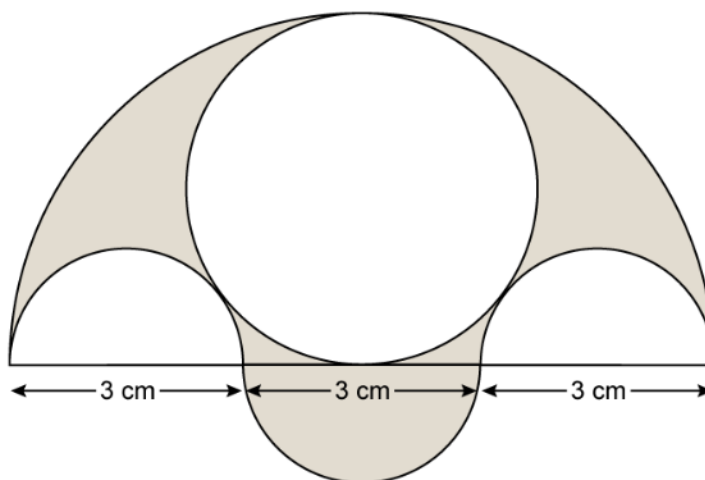
- 5. A circle touches all the four sides of a quadrilateral ABCD. Prove that $AB + CD = BC + DA$
- 6. Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord.
- 7. A line intersects the y-axis and x-axis at the points P and Q respectively. If (2, -5) is the mid-point of PQ, then find the coordinates of P and Q.

8. If the distances of $P(x, y)$ from $A(5, 1)$ and $B(-1, 5)$ are equal, then prove that $3x = 2y$.
9. Find the value of p , for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.
10. For what value of n , are the n^{th} terms of two A.Ps $63, 65, 67, \dots$ and $3, 10, 17, \dots$ equal?

SECTION C

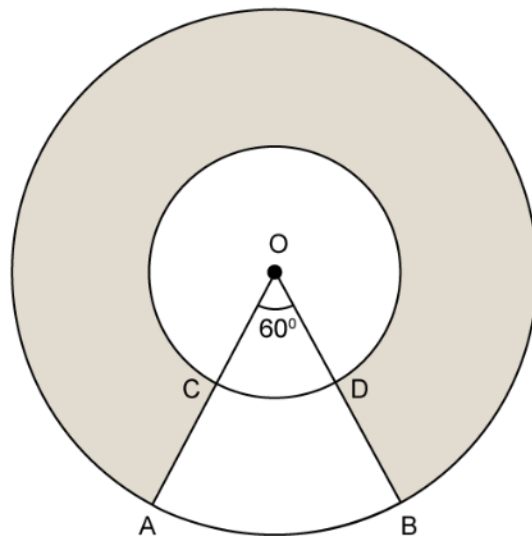
Question numbers 11 to 20 carry 3 marks each.

11. On a straight line passing through the foot of a tower, two points C and D are at distances of 4 m and 16 m from the foot respectively. If the angles of elevation from C and D of the top of the tower are complementary, then find the height of the tower.
12. A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag.
13. Three semicircles each of diameter 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure. Find the area of the shaded region.



14. In what ratio does the point $\left(\frac{24}{11}, y\right)$ divide the line segment joining the points $P(2, -2)$ and $Q(3, 7)$? Also find the value of y .

- 15.** Water in a canal, 5.4 m wide and 1.8 m deep, is flowing with a speed of 25 km/hour. How much area can it irrigate in 40 minutes, if 10 cm of standing water is required for irrigation?
- 16.** In the given figure, two concentric circles with centre O have radii 21 cm and 42 cm. If $\angle AOB = 60^\circ$, find the area of the shaded region. $\left(\text{Use } \pi = \frac{22}{7}\right)$



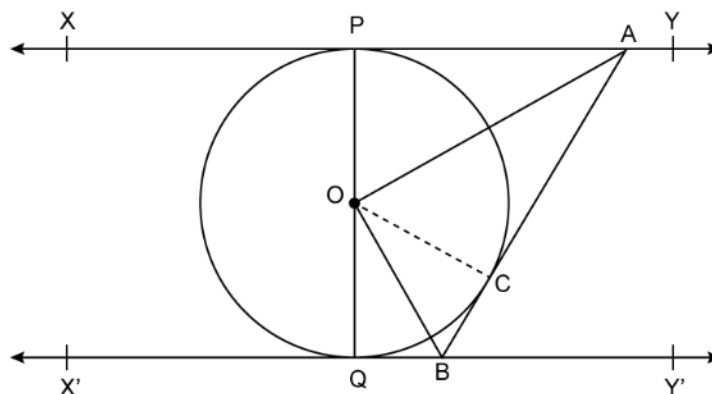
- 17.** The dimensions of a solid iron cuboid are 4.4 m \times 2.6 m \times 1.0 m. It is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5 cm. Find the length of the pipe.
- 18.** A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius on its circular face. The total height of the toy is 15.5 cm. Find the total surface area of the toy.
- 19.** How many terms of an A.P. 9, 17, 25, must be taken to give a sum of 636?
- 20.** If the roots of the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal, prove that $\frac{a}{b} = \frac{c}{d}$.

SECTION D

Question numbers 21 to 31 carry 4 marks each.

- 21.** If the points A(k + 1, 2k), B(3k, 2k + 3) and C(5k - 1, 5k) are collinear, then find the value of k.

- 22.** Construct a triangle ABC with side $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the $\triangle ABC$.
- 23.** Two different dice are thrown together. Find the probability that the numbers obtained have
 (i) even sum, and
 (ii) even product
- 24.** In the given figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangents AB with point of contact C, is intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$.



- 25.** In a rain-water harvesting system, the rain-water from a roof of $22 \text{ m} \times 20 \text{ m}$ drains into a cylindrical tank having diameter of base 2 m and height 3.5 m . If the tank is full, find the rainfall in cm. Write your views on water conservation.
- 26.** Prove that the lengths of two tangents drawn from an external point to a circle are equal.
- 27.** If the ratio of the sum of the first n terms of two A.Ps is $(7n + 1) : (4n + 27)$, then find the ratio of their 9th terms.
- 28.** Solve for x :

$$\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2, \text{ where } x \neq -\frac{1}{2}, 1$$
- 29.** A takes 6 days less than B to do a work. If both A and B working together can do it in 4 days, how many days will B take to finish it?
- 30.** From the top of a tower, 100 m high, a man observe two cars on the opposite sides of the tower and in same straight line with its base, with its base, with angles of depression 30° and 45° . Find the distance between the cars.
 [Take $\sqrt{3} = 1.732$]

- 31.** In the given figure, O is centre of the circle with $AC = 24$ cm, $AB = 7$ cm and $\angle BOD = 90^\circ$. Find the area of the shaded region.

