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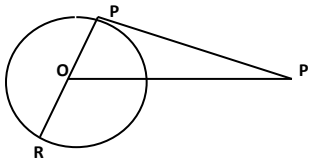
Class – X **Mathematics**

GENERAL INSTRUCTIONS:

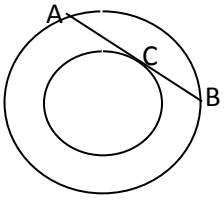
1. All questions are compulsory.
2. The question paper consists of thirty four questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of eight questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of six questions of 04 marks each.
3. All questions in section A are multiple choice questions where you are to select one correct option out of given four.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 04 mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

Section – 'A'

1. If one root of a quadratic equation is $2 + \sqrt{5}$, then the quadratic equation is:
   (a) $x^2 - 4x - 1$ (b) $x^2 + 4x - 1$
   (c) $x^2 - 4x + 1$ (d) $x^2 + 4x + 1$
2. The sum of all the two digit odd positive numbers is:
   (a) 2457 (b) 5427
   (c) 2475 (d) 2745
3. A quadrilateral ABCD circumscribes a circle with centre O, then:
   (a) $ABC + AD = BC + CD$ (b) $AB + CD = AD + BC$
   (c) $AB + BC = AD + CD$ (d) $AB - AD = CD - BC$
4. In the adjoining figure, PQ is a tangent from P to the circle & QOR is a diameter. If $\angle POR = 130°$, then $\angle QPO$ is:
   (a) $40°$ (b) $45°$
   (c) $50°$ (d) $75°$



5. The line AB is 6m in length & is tangent of the inner one of the two concentric circles at point C. It is known that the radii of the two circles are integers, the radii of the inner circle is:
   (a) $8m$ (b) $4m$
   (c) $6m$ (d) $3m$

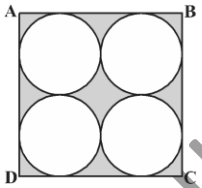


6. Find the length of the tangent drawn from a point whose distance from the centre of a circle is $25cm$. Given that the radius of the circle is $7cm$:
   (a) $2\sqrt{6}$ cm (b) $24cm$
   (c) $\sqrt{23}$ cm (d) $24.5cm$
7. The surface are of a cube whose volume is $64cm^3$ is:
   (a) $98cm^2$ (b) $96cm^2$
   (c) $86cm^2$ (d) $68cm^2$

8. In a circle of radius 21cm, an arc subtended an angle of $60°$ at the centre. The length of the arc is:
   (a) 21cm (b) 22cm
   (c) 20cm (d) 24cm
9. A dice a thrown once, what is the probability of getting a number other than 6:
   (a) 1 (b) $\frac{5}{6}$
   (c) 0 (d) none of these
10. A hill slopes upward at an angle of $30°$ with the horizontal. What height does a man rise, when he walks 100m up the hill:
   (a) 50m (b) $50\ \overline{3}\ \text{m}$
   (c) $25\ \overline{3}\ \text{m}$ (d) $50\ \overline{6}\ \text{m}$

Section – 'B'

11. Find the roots of the following quadratic equations, if they exist, by the method of completing the square: $4x^2 + 4\ \overline{3}x + 3 = 0$
12. Determine the AP whose 3rd term is 5 and the 7th term is 9.
13. The lengths of tangents drawn from an external point to a circle are equal.
14. Find the area of the shaded region in where ABCD is a square of side 14 cm.



15. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.
16. Find the values of y for which the distance between the points P(2, – 3) and Q(10, y) is10 units.
17. Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (– 3, 4).
18. Two players, Sangeeta and Reshma, play a tennis match. It is known that the probability of Sangeeta winning the match is 0.62. What is the probability of Reshma winning the match?

OR

Savita and Hamida are friends. What is the probability that both will have (i) different birthdays? (ii) the same birthday? (Ignoring a leap year).

Section – 'C'

19. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

OR

Find two consecutive odd positive integers, sum of whose squares is 290.

20. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

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21. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

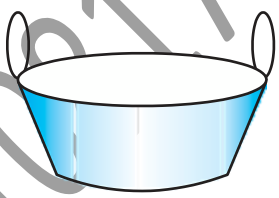
OR

A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC

22. Draw a triangle ABC with side BC =7 cm, $\angle B = 45°, \angle A = 105°$. Then, construct a triangle whose sides are 4/3 times the corresponding sides of ΔABC.

23. A racing track whose left and right ends are semicircular: The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find:
    (i) the distance around the track along its inner edge
    (ii) the area of the track.

24. Hanumappa and his wife Gangamma are busy making jaggery out of sugarcane juice. They have processed the sugarcane juice to make the molasses, which is poured into moulds in the shape of a frustum of a cone having the diameters of its two circular faces as 30 cm and 35 cm and the vertical height of the mould is 14 cm. If each cm³ of molasses has mass about 1.2 g, find the mass of the molasses that can be poured into each mould.



OR

A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter 1/16 cm, find the length of the wire.

25. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.
26. Determine the ratio in which the line 2x + y – 4 = 0 divides the line segment joining the points A(2, – 2) and B(3, 7).
27. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.
28. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5.

Section – 'D'

29. Find the discriminant of the equation $3x^2 - 2x + \frac{1}{3} = 0$ and hence find the nature of its roots. Find them, if they are real.

OR

Sum of the areas of two squares is 468 m². If the difference of their perimeters is 24 m, find the sides of the two squares.

30. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.
31. XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that ∠AOB = 90°.

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32. A juice seller was serving his customers using glasses. The inner diameter of the cylindrical glass was 5cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. Use π=3.14

OR

A hemispherical tank full of water is emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? $Take\ \pi = \frac{22}{7}$

33. The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm. Find its volume, the curved surface area and the total surface area. $Take\ \pi = \frac{22}{7}$

34. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30° (see Fig. 9.13). Find the distance travelled by the balloon during the interval.

M. C.Q. Answers:

1. a
2. c
3. b
4. a
5. d
6. b
7. b
8. b
9. c
10. a

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All other questions are from NCERT. Check your textbook for answers