IIITB COMET FOUNDATION

Name: sivaram
ID: cometfwc039
Date of joining: 20/01/2026

Series JSR **SET-2**

Roll No. _____ **Code No. 30/2**

SUMMATIVE ASSESSMENT - II
MATHEMATICS

Class - X

Time allowed: 3 hours **Maximum Marks: 90**

General Instructions:

1. All questions are compulsory.
2. The question paper consists of **31** questions divided into four sections A, B, C and D.
3. 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.
4. Use of calculators is not permitted.

SECTION – A

Question numbers 1 to 4 carry 1 mark each.

1. A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder.

2. For what value of k will $k + 9$, $2k - 1$ and $2k + 7$ be the consecutive terms of an A.P.?

3. In Fig. 1, PQ is a tangent at a point C to a circle with centre O. If AB is a diameter and $\angle CAB = 30°$, find $\angle PCA$.

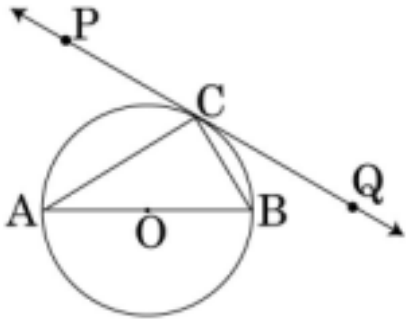

Figure 1: Fig. 1

4. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

SECTION – B

Question numbers 5 to 10 carry 2 marks each.

5. In Fig. 2, a quadrilateral ABCD is drawn to circumscribe a circle, with centre O, in such a way that the sides AB, BC, CD and DA touch the circle at the points P, Q, R and S respectively. Prove that $AB + CD = BC + DA$.

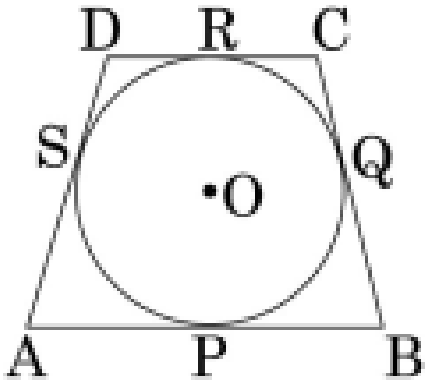

Figure 2: Fig. 2

6. The 4^{th} term of an A.P. is zero. Prove that the 25^{th} term of the A.P. is three times its 11^{th} term.

7. In Fig. 3, from an external point P, two tangents PT and PS are drawn to a circle with centre O and radius r. If $OP = 2r$, show that $\angle OTS = \angle OST = 30°$.

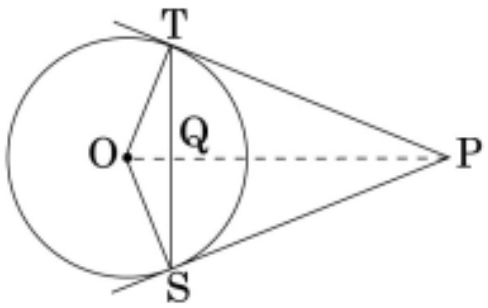

Figure 3: Fig. 3

8. Prove that the points $(3, 0)$, $(6, 4)$ and $(-1, 3)$ are the vertices of a right angled isosceles triangle.

9. Let P and Q be the points of trisection of the line segment joining the points $A(2, -2)$ and $B(-7, 4)$ such that P is nearer to A. Find the coordinates of P and Q.

10. Solve for x: $\sqrt{2x + 9} + x = 13$.

SECTION – C

Question numbers 11 to 20 carry 3 marks each.

11. If the point $P(x, y)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$, prove that $bx = ay$.

12. A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. (Use $\pi = \frac{22}{7}$)

13. In Fig. 4, O is the centre of a circle such that diameter $AB = 13$ cm and $AC = 12$ cm. BC is joined. Find the area of the shaded region. (Take $\pi = 3.14$)

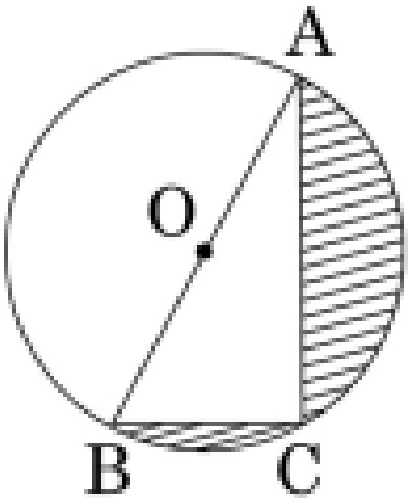

Figure 4: Fig. 4

14. A sphere of diameter 12 cm is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel.

15. In Fig. 5, a tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of Rs. 500/sq.metre. (Use $\pi = \frac{22}{7}$)

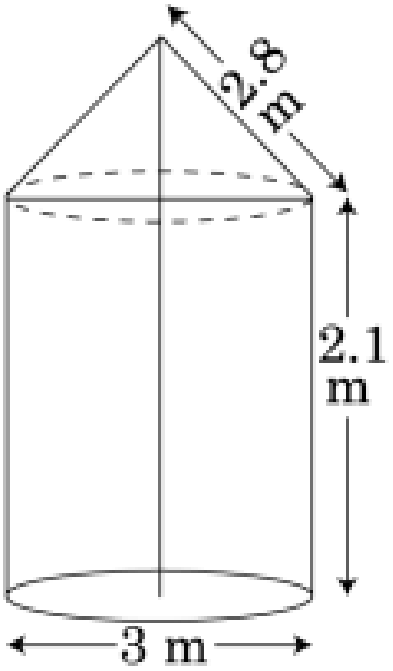

Figure 5: Fig. 5

16. In Fig. 6, find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC = 40°$. (Use $\pi = \frac{22}{7}$)

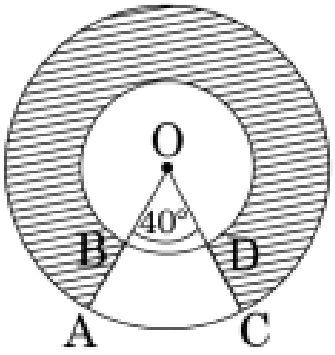

Figure 6: Fig. 6

17. A man standing on the deck of a ship, which is 10 m above water level, observes the angle of

elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill.

18. The digits of a positive number of three digits are in A.P. and their sum is 15. The number obtained by reversing the digits is 594 less than the original number. Find the number.

19. If the roots of the quadratic equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ are equal, prove that $2a = b + c$.

20. From a pack of 52 playing cards, Jacks, Queens and Kings of red colour are removed. From the remaining, a card is drawn at random. Find the probability that drawn card is:

(i) a black King

(ii) a card of red colour

(iii) a card of black colour

SECTION – D

Question numbers 21 to 31 carry 4 marks each.

21. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide place and the canvas for 1500 tents to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of height 2.1 m. If the canvas used to make the tents costs Rs. 120 per sq.m, find the amount shared by each school to set up the tents. What value is generated by the above problem? (Use $\pi = \frac{22}{7}$)

22. In Fig. 7, two equal circles, with centres O and O', touch each other at X. OO' produced meets the circle with centre O' at A. AC is tangent to the circle with centre O, at the point C. O'D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$.

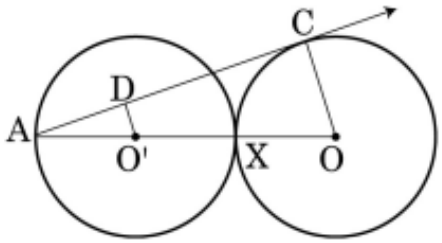

Figure 7: Fig. 7

23. A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that product of x and y is less than 16.

24. In Fig. 8, the vertices of ΔABC are $A(4,6)$, $B(1,5)$ and $C(7,2)$. A line-segment DE is drawn to intersect the sides AB and AC at D and E respectively such that $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{3}$. Calculate the area of ΔADE and compare it with area of ΔABC.

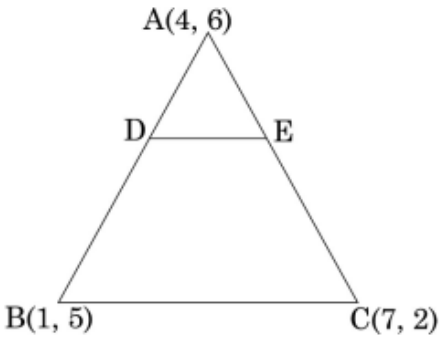

Figure 8: Fig. 8

25. In Fig. 9, is shown a sector OAP of a circle with centre O, containing angle θ. AB is perpendicular to the radius OA and meets OP produced at B. Prove that the perimeter of shaded region is $r[\tan\theta + \sec\theta + \frac{\pi\theta}{180} - 1]$.

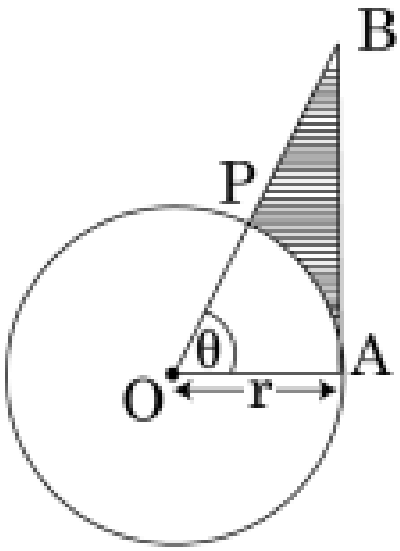

Figure 9: Fig. 9

26. The houses in a row are numbered consecutively from 1 to 49. Show that there exists a value of X such that sum of numbers of houses preceding the house numbered X is equal to sum of the numbers of houses following X.

27. A motor boat whose speed is 24 km/h in still water takes 1 hour more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream.

28. Draw an isosceles ΔABC in which $BC = 5.5$ cm and altitude $AL = 3$ cm. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of ΔABC.

29. Prove that tangent drawn at any point of a circle is perpendicular to the radius through the point of contact.

30. As observed from the top of a light house, 100 m high above sea level, the angles of depression of a ship, sailing directly towards it, changes from 30° to 60°. Find the distance travelled by the ship during the period of observation. (Use $\sqrt{3} = 1.73$)

31. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find the length and breadth of the rectangular park.