MATHEMAGICS VANDANA BANSAL M : 9855188797

CLASS X
SAMPLE PAPER
MATHS

SECTION – A [1 mark each]

1. Which of the following equations has two distinct real roots ?

   (a) $2x^2 - 3\sqrt{2}\,x + \dfrac{9}{4} = 0$ (b) $x^2 + 4x - 3\sqrt{2} = 0$ (c) $x^2 - 4x - 3\sqrt{2} = 0$ (d) $5x^2 - 3x + 1 = 0$

2. Sum of first n terms of a series is $5n^2 + 2n$, then its second term is

   (a) 15   (b) 16   (c) 17   (d) none of these

3. Two concentric circles are of radii 13cm and 5cm. The length of the chord of larger circle which touches the smaller circle is

   (a) 12cm   (b) 20cm   (c) 24cm   (d) 26cm

4. The coordinates of the middle points of the sides of a triangle are (4, 2) (3, 3) and (2, 2), then the coordinates of its centroid are

   (a) (3, 7/3)   (b) (3, 3)   (c) (4,3)   (d) none of these

5. If for an A.P. $T_4 + T_8 = 24$ and $T_6 + T_{10} = 34$, then first term =

   (a) 1/2   (b) 3/2   (c) -1/2   (d) -3/2

6. If one roots of the equation $px^2 - 14x + 8 = 0$ is six times the other, then p is equal to

   (a) 2   (b) 3   (c) 1   (d) none of these

7. Find the angle of elevation of the top of a tower $100\sqrt{3}$ m long, from a point at a distance of 100m , from the foot of the tower in a horizontal plane.

   (a) 45°   (b) 30°   (c) 60°   (d) NONE

8. The area of the shaded region in Fig. , if ABCD is a square of side 14 cm and APD and BPC are semicircles.

   (a) $24 cm^2$ (b) $42\ cm^2$ (c) $420\ cm^2$ (d) none of these

9. The height of a cone is 60 cm. A small cone is cut off at the top by a plane parallel to the base and its volume is $\dfrac{1}{64}$ th the volume of original cone. The height from the base at which the section is made is.

   (a) 15 cm   (b) 30 cm   (c) 45 cm   (d) 20 cm.

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10. If angle between two radii of a circle is 130° , then the angle between the tangents at the ends of the radii is

(a) 90°   (b) 50°   (c) 70°   (d) 40°

SECTION – B [2 mark each]

11. A square is inscribed in a circle. What is the ratio of the areas of the circle and the square.

12. Write the nature of roots of the quadratic equation $\sqrt{5}x^2 - 3\sqrt{6}x - \sqrt{20} = 0$.

13. (i) The perimeter of a sector of a circle of radius 5 . 2 cm is 16.4 cm . Find the area of the sector

(ii) The diameter of a circle is 84 cm. Find the number of revolutions it will make in moving 792 meters.

14. (i) The distance between A (x,7) and B (1,3) is 5. calculate x.

(ii) Solve for x: $a^2b^2x^2 + b^2x - a^2x - 1 = 0$

15. The incircle of ΔABC touches the side AB, BC & CA at P, Q & R respectively. Show that $AP + BQ + CR = \frac{1}{2}$ (perimeter of ΔABC)

16. Rao started work in 1995 at an annual salary of Rs. 5000 and recieved an increment of Rs. 200 each year . In which year did his income reach Rs. 7000

17. If the coordinates of the middle point of the line segment joining the point (2 , 1)(1,-3) be (α ,β) ,prove that 6α+β-8 = 0.

18. Find the number of terms in the series 20, $19\frac{1}{3}$, $18\frac{2}{3}$,…. of which the sum is 300, explain the double answer.

SECTION – C [3 mark each]

19. (i)Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is : (a) an even number, (b) a number less than 14, (c) a number which is a perfect square, (d) a prime number less than 20.

(ii)Two customers **SEAROSE** and **POOJA** are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day so on another day . What is the probability that both will visit the shop on (i) same day ?(ii) consecutive days?(iii)different days ?

20. PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semi-circles are drawn on PQ and QS as diameters. Find the perimeter and area of shaded region. (Use π = 3.14).

21. There are two poles, one each on either bank of a river just opposite to each other. One pole is 60m high. From the top of this pole, the angles of depression of the top and the foot of the other pole are 30^0 and 60^0 respectively. Find the width of the river and the height of the other pole.

22. (i)The rain water from a roof 22m × 20 m drains into a cylindrical vessel having diameter of base 2m and height 3.5 m . If the vessel is just full, find the rainfall in cm.

(ii)Water flows at the rate of 10 m per minute through a cylindrical pipe having its diameter as 5mm.How much time will it take to fill a conical vessel whose diameter of base is 40cm and depth
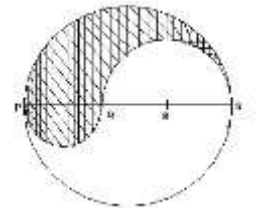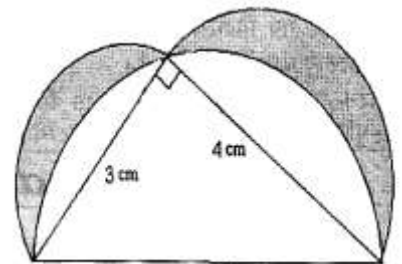
24cm ?

23. (i) Find the ratio in which the point (- 3 , p) divides the line segment joining the points (-5,-4)& (-2 ,- 3) . Hence find the value of p

(ii) A hemispherical bowl of internal diameter 36 cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3 cm and height 6 cm. How many bottles are required to empty the bowl?

24. Prove that, the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the center of the circle.

25. Draw a circle of 3 .4 cm radius. Take a point P outside the circle. Draw two tangents to the circle from the point P without using the center

26. (i)If the points A(1,-2), B(2,3), C (a,2) and D(-4,-3) form a parallelogram, find the value of a and height of the parallelogram taking AB as base.

(ii)The co-ordinates of the vertices of ΔABC are A (4,1),B (-3,2) and C (0 , k).Given that the area of ABC is $12 unit^2$, find the value of k.

27. The sum of the first, p, q, r terms of an A.P. are a, b, c respectively. Show that $\frac{a}{p}$ (q–r) + $\frac{b}{p}$ (r – p)+ $\frac{c}{r}$ (p–q) = 0

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

SECTION – D [4 mark each]

29. (i)The denominator of a fraction is 1 more than twice the numerator. The sum of the fraction and is reciprocal is $2\frac{16}{21}$ .Find the fraction.

(ii)Some students planned a picnic. The budget for food was Rs. 500. But 5 of these failed to go and thus the cost of food for each student increased by RS. 5. How many students attended the picnic

30. (i)If PAB is secant and PT is tangent to a circle then prove that $PA \times PB = PT^2$.

(ii)The radii of two concentric circles are 8 cm and 13 cm . AB is a diameter of the bigger circle touching it at D. Find the length of AD .

31. Find the area of the shaded region.

32. (i) An aeroplane flying horizontally at a height of 2500 m above the ground is observed at an elevation of 60° . If after 15 seconds, the angle of elevation is observed to be 30° , find the speed of the aeroplane in km per hr

(ii) The vertices of a triangle are (2,a), (1,b) and (c²,-3). (a) Prove that its centroid cannot lie on the y-axis. (b) Find the condition that the centroid may lie on the x-axis.

33. A bucket of height 8 cm and made up of copper sheet is in the form of frustum of a right circular cone with radii of its lower and upper ends as 3 cm and 9 cm respectively .Calculate:(i) the height of the cone of which the bucket is a part(ii)the volume of water which can be

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filled in the bucket.(iii) the area of copper sheet required to make the bucket (leave the answer in terms of π).

34. (i)A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45° how soon after this, will the car reach the tower?

(ii)A boy is standing on the ground and flying a kite with 150 m of string at an elevation of 30°. Another boy is standing on the roof of a 25 m high building and is flying his kite at an elevation of 45°. Both the boys are on opposite sides of both the kites. Find the length of the string that the second boy must have so that the two kites meet.

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