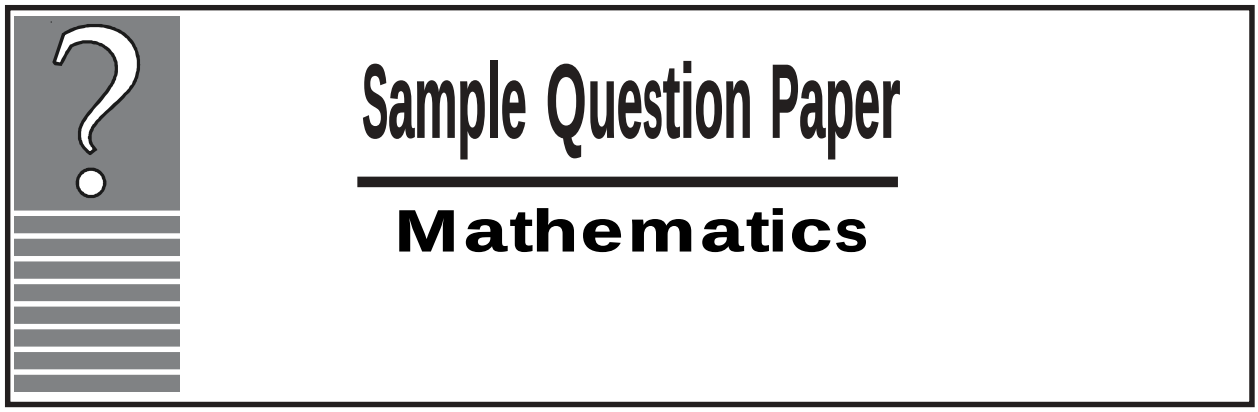

Sample Question Paper

Mathematics

Set I

SAMPLE QUESTION PAPER

MATHEMATICS

STANDARD - X

Maximum Marks : 100
Time : 2½ hrs.
Cool off time : 15 mts.

Instructions

- *Read the instructions given against each question carefully before answering them.*
- *State the logical reasoning which you have used whereever necessary.*
- *Choice questions are given for a few questions. Attempt any one of them.*
- *Use the cool-off time for reading and analysing the questions. Also plan your answers accordingly.*

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1. A circle is drawn with centre on the number line. Centre denotes the number 5. The circle cuts the number line at 11. What is the radius of the circle. The circle cuts the number line at a second point. What is the number denoted by the second point of intersection.

   (1 + 1 = 2 Marks)

2. The roots of the equation $x^2 + an + b = 0$ are 5 and -8. Using this fact express the polynomial $x^2 + ax + b$ as a product of two first degree polynomials. *(2 Marks)*

3. What is the remainder when the polynomial $2x^3 - 5x^2 + 7x + 8$ is divided by $(2x - 1)$? What is the number that is to be added to this polynomial so that $(2x - 1)$ is a factor of the resulting polynomial. *(2 Marks)*

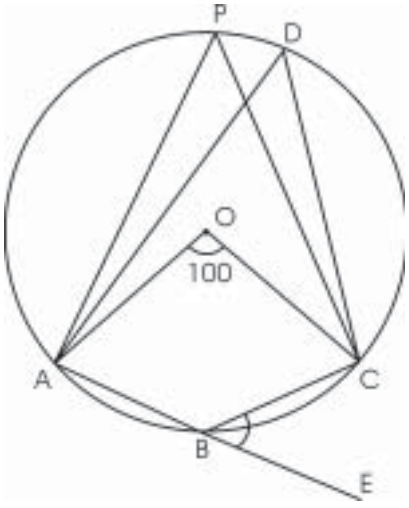
4. Based on the figure some statements are given. Give reason for each statement.

   a. $\angle P = 50^o$ (.....) *(½ Marks)*

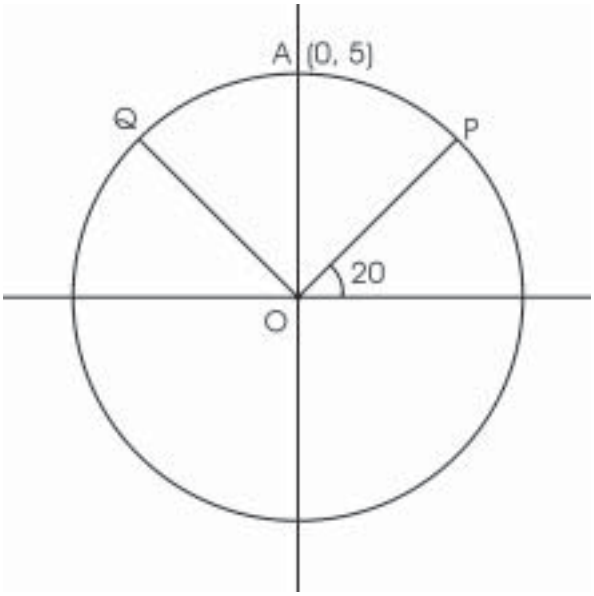
   b. $\angle P = \angle D = 50^o$ (.....)*(1 Marks)*

   c. $\angle ABC = 130^o$ (.....) *(½ Marks)*

   d. $\angle CBE = \angle P$ (.....) *(1 Marks)*



5. In the figure O is the centre and origin. The point A is (0, 5). What is the radius of the circle? If ∠BOP is 20°. What are the coordinates of P? If ∠POQ = 90° Find the coordinates of Q. (Sin 20 = .34, Cos 20 = .94 Tan 20 = .36) *(3 Marks)*



6. Prove that no number when added to 13 times of its reciprocal will give the number 7. *(3 Marks)*

7. (a) What is the 18th term of an Arithmetic progression whose nth term is 3n - 4. *(1 Marks)*

   (b) What is the n^{th} term of the arithmetic progression 12, 18, 24, ...? *(1 Marks)*

   (c) $3n^2 + 5n$ will never be the nth term of an Arithmetic progression. Why? *(1 Marks)*

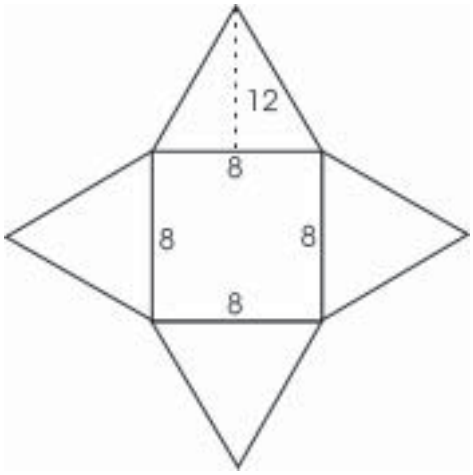
8. A man views the top of a tree at an angle of elevation of 45°. Then be walks 40 meters to wards the tree and views the top of the tree at an angle of elevation of 70°. Draw a rough figure based on the above facts. Calculate the height of the tree. (Sin 70 = .94, Cos 70 = .34, Tan 70 = 2.75) *(1 + 2 = 3 Marks)*

9. When the polynomial P(x) is divided by (x - 5) the quotient is $2x^2 - 9x + 16$ and the remainder is 36. Based on this fact fill up suitable in

   (a) P(x) = (.....) (.....) + 36 .....

   (b) Prove that (x - 1) is a factor of P(x) *(1 + 2 = 3 Marks)*

10. (A) The following is the figure corresponding to a solid which is cut open and placed flat.



(a) What is the most suitable name of the solid? *(½ Marks)*

(b) The measures 8 and 12 given in the figure will be equal to which measures of the solid? *(1 Marks)*

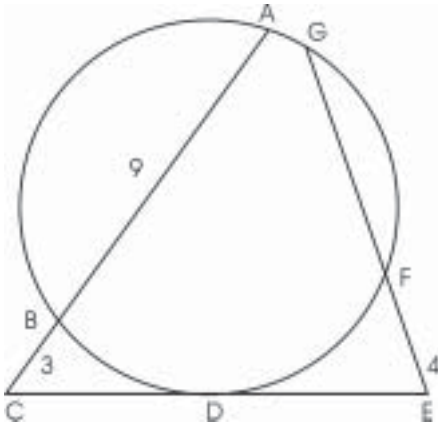
(c) Find the total surface area of the solid. *(1½ Marks)*

OR

10. (B) The inner length, width and height of a rectangular box are respectively 26 cms, 8 cms and 8 cms What is the maximum number of spheres of radius 4 cms that can be packed in this box? What is the total volume of the spheres? *(3 Marks)*

11. Both coordinates of the centre of a circle drawn are positive numbers. The radius of the circle is 6 cms It touches the x - axis at point (5, 0). Draw a rough figure based on this. Find the coordinates of the centre of the circle. *(3 Marks)*

12. In the figure AB = 9 cms BC = 3 cms CE = 14 cms. EF = 4 cm. If the line CE touches the circle at D. Find the lengths of



(a) CD = ... *(1 Marks)*

(b) ED = ... *(½ Marks)*

(c) FG = ... *(1½ Marks)*

13. A plot of land is in the shape of a square. Adjoining one boundary of the plot from one corner to the second a piece of land of width 4 meters is donoted for constructing a road. The area of the remaining plot is 525 sq. meters. Draw a rough figure based on this. Find the length of the original plot. *(1 + 3 = 4 Marks)*

14. From a circular lamina of radius 60^o , a sector of central angle 216^o is cut and folded to from a cone.

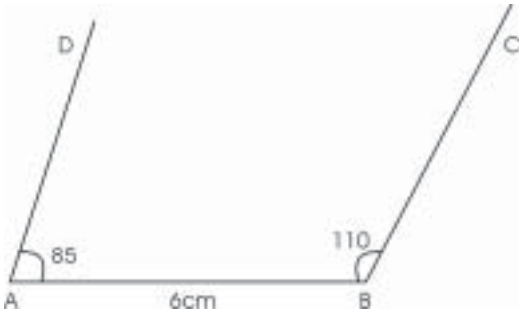
    (a) What measure of the cone will be equal to the radius of the circular lamina. *(½ Marks)*

    (b) What is the radius of the cone formed? *(1 ½ Marks)*

    (c) What is the volume of the cone? *(2 Marks)*

15. The incircle of a triangle touches all the three sides of the triangle. Based on the principles involved in constructing the incircle. Write a method to draw the circle touching all the three lines in the following figure. *(1 Marks)*

    Draw the figure and the circle using the given measures. (You can extend the lines AD and BC as you please) *(1 + 2 Marks)*



16. The point A (3,7) and B (8,11) are marked perpendiculars drawn from A and B to the X axis meets the axis at the points C and D respectively. AE is the perpendicular from A to BD.

    (a) Draw a rough figure based on this *(1 Marks)*

    (b) Find the coordinates of C, D and E. *(3 Marks)*

17. A solid is in the shape of a cylinder fitted with a hemisphere of equal radius on one flat face. The common radius is 3 units. The total height is 15 units.

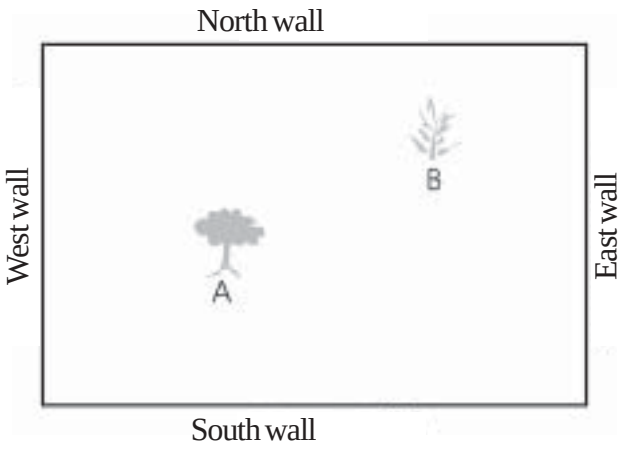
    (a) Draw a rough figure and mark all measures. *(1 Marks)*

    (b) Find the volume of the compound solid. *(3 Marks)*

18. Perimeter of a rectangular piece of paper is 60 cms. From this a square of maximum area is cut off. The area of the remaining piece of paper is 100 sq. cm. Find the width of the original piece of paper. *(4 Marks)*

19. Prove that an issocles trapezium is cyclic a quadrilateral. *(4 Marks)*

20.



There is a rectangular plot as shown in the figure. At the position marked A and B there is a mango tree and a tamarind tree. The mango tree is 10 meters away from south wall and 13 meters away from the west wall. Similarly the tamarind tree is 16 meters from south wall and 21 meters from west wall. Based on the activities of the class mark the positions of the two trees using numbers. Using these numbers find the distance between the two trees.

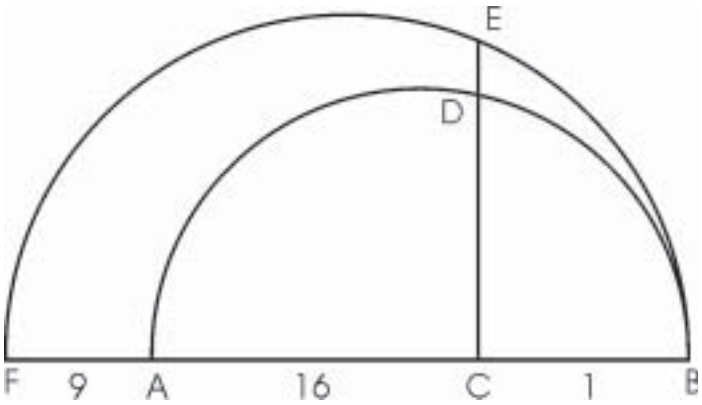
(4 Marks)

21. A small cone of radius 3 cms is cut off from a cone of radius 12 cms and height 20 cms.

    (a) What is the height of the small cone? *(1½ Marks)*

    (b) What is the volume of the resulting frustrum? *(2½ Marks)*

22. In the figure two semi circles with centres on line BF are shown. AC = 16, BC = 1 AF = 9. What is the length of line CD? What is the length of the line DE? *(4 Marks)*



23. (A) As a part of an assignment Smitha wrote all multiplies of 8 between 200 and 700. Sateesh wrote all numbers between 200 and 700 which leave a remainder 3 when divided by 8.

Who wrote more numbers? How many more? *(2 Marks)*

What is the difference between the sum of numbers written by Smitha and the sum of numbers written by Sateesh? *(2 Marks)*

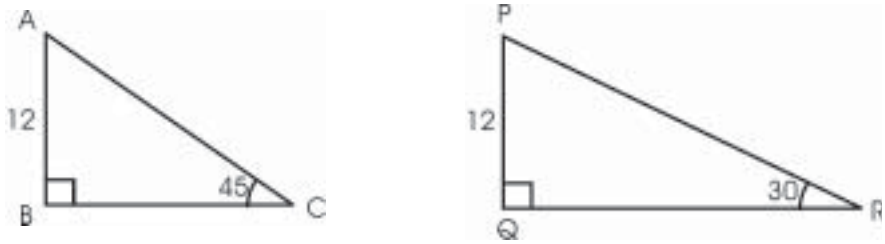
OR

23. (B) (a) Write an arithmetic progression consisting of 5 terms whose sum is 30. *(1 Marks)*

(b) Sum of 21 consecutive terms of an arithmetic progression is 420. What will be the 11th term of that progression. *(1 Marks)*

(c) Sum of the first term and the 20th term of an arithmetic progression is 100. What will be sum of the first 5 terms and the last 5 terms of the above progression? *(2 Marks)*

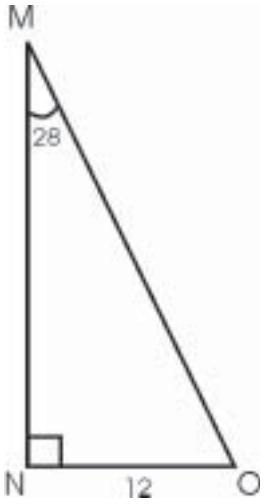
24. (A)



(a) In the figure AB = PQ = 12. ∠C = 45, ∠R = 30°.

Based on the above figures find the lengths of BC, AC, QR and PR from among 24, 12, $12\sqrt{3}$, $12\sqrt{2}$.

(1 ½ Marks)



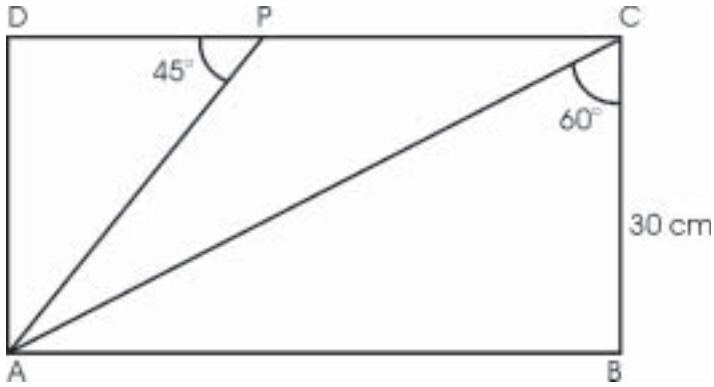
(b) Using the figure choose two measures each for each of MN and NO from the following.

$\frac{12}{Sin\,28}$, $\frac{12}{Tan\,28}$, $\frac{12}{Cos\,62}$, $12 \times Tan\ 62$

(2 ½ Marks)

OR

24. (B) Given below is the wire model corresponding to an item prepared by Manu for an exhibition.



ABCD is a rectangle. BC = 30 cm.

(a) Find the length of AD. *(½ Marks)*

(b) Find length of AP. *(1 Marks)*

(c) Find length of AC *(1 Marks)*

(d) What is the total length of wire used? *(1½ Marks)*

25. (A) One of the polynomial (x - 1) and (x + 4) is a factor of the polynomial $2x^3 + x^2 - 28x$.

Which of them is the factor? *(1 ½ Marks)*

Using the information factorise $2x^3 + x^2 - 28x$ completely. *(2 ½ Marks)*

OR

25. (B) (a) What is the number of roots of the equation $3x^2 + 7x + 5 = 0$. *(1 ½ Marks)*

(b) Will the value of the polynomial $3x^2 + 7x + 5$ be equal to zero for any value of x? *(½ Marks)*

(c) For how many different values of x will the value of the polynomial $2x^2 + 10x + 7$ be equal to zero? *(2 Marks)*

26. The length of a hyrange road is 24 kms. The first 3 kms of this road belongs to Mayapuram Panchayath and the last 4 kms belong to Sidhapuram Panchayath. The remaining part belongs to Karnapuram Panchayath. The length of road belonging to Karnapuram Panchayath is to be tarred. For the first kilometer the cost is 40,000. For each succeeding kilometer the cost exceeds the cost of the proceeding kilometer by Rs. 5,000. What is the total cost for tarring the road. *(2½ Marks)*

When the work was completed. It was noticed that the work was not upto the standard prescribed. So from the amount due to the constructor an amount of Rs. 400 was reduced for the first kilometer. For each succeeding kilometers an amount of Rs. 50 more than that of the proceeding kilometer was reduced. What will be the total amount given to the contractor. *(2½ Marks)*

27. (a) Arc ABC is the complementing are arc of arc ADC of a circle. Ratio of the central angle of these two arcs is 1:5. Find the central angle of each arc. *(2 Marks)*

    (b) Find ∠ABC and ∠ADC *(1 Marks)*

    (c) If ∠ DCB is 30 more than double that of ∠ DAB. Find ∠ DCB and ∠ DAB. *(2 Marks)*

28. Ramu who is an employee of a company got the following wages in 6 consecutive days. Rs. 80, Rs. 85, Rs. 100, Rs. 110, Rs. 115, Rs. 120. Find the average wage of Ramu for these 6 days. In Ramu's company there are a total of 100 employees. A table showing details of wages of these 100 employees is given in the following table. Based on that find the average daily wages of an employee. *(1½ + 3½ 5 Marks)*

Wages	**Number of employees**
70 - 80	10
80 - 90	20
90 - 100	10
100 - 110	15
110 - 120	25
120 - 130	20
Total	100

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