

**CBSE UNIT TEST PAPER-05**

**CLASS - X (MATHEMATICS)**

**Time : 3 Hours**

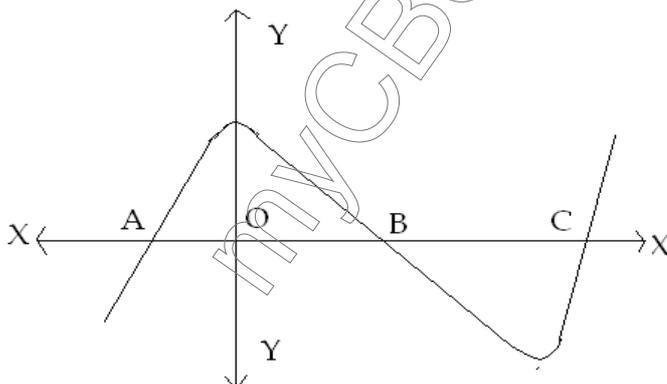
**M.M.80**

**GENERAL INSTRUCTIONS :-**

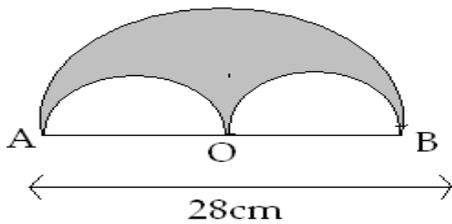
1. All questions are compulsory.
2. There are four section A,B, C and D  
Section A contains 10 questions of 1 mark each  
Section B contains 5 questions of 2 marks each  
Section C contains 10 questions of 3 marks each and  
Section D contains 5 questions carrying 6 marks each
3. There is one internal choice in section B, three in section C and two in section D.
4. Use of calculator and mobile phone is not permitted

**SECTION A**

1. State the Fundamental Theorem of Arithmetic's.
2. The graph of  $y = f(x)$  is given below. Find the number of zeroes of  $f(x)$



3. Write a rational number between  $\sqrt{2}$  and  $\sqrt{3}$
4. What is the nature of roots of quadratic equation  $4x^2 - 12x + 9 = 0$ ?
5. Find perimeter of the given shaded region.



6. The length of tangent from a point A at a distance of 5cm from centre of a circle is 4cm. What will be radius of the circle?
7. Which measure of central tendency is given by x-coordinate of the point of intersection of the "more than ogive" and "less than ogive"?
8. A bag contains 5 red and 5 black balls. A ball is drawn at random from the bag. What is the probability of getting a red ball?
9. What is the distance between two parallel tangents of a circle of radius 4cms?
10. The height of a tower is 10m. Find the altitude of sun if the shadow of the tower is equal to the height of the tower.

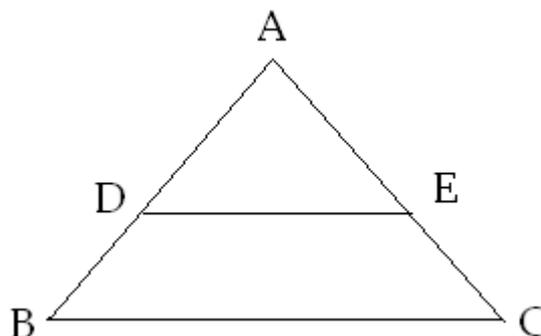
### SECTION B

11. From pocket money, child saves Re 1 first day, Re 2 second day, Re 3 third day and so on in a month. How much money will the child save in the month of February 2008?
12. Express  $\sin 65^\circ + \cos 75^\circ$  in terms of trigonometric ratios of angles between  $0^\circ$  and  $45^\circ$

OR

If A, B and C are interior angles of a  $\triangle ABC$  then show that  $\cos \left( \frac{B + C}{2} \right) = \sin \frac{A}{2}$

13. in the figure given below,  $DE \parallel BC$  and  $DE : BC = 4:5$  then find the ratio of the areas of  $\triangle ADE$  and  $\triangle ABC$



- 14 All the Queens, Jacks and diamonds have been removed from a pack of 52 cards. The remaining cards have been reshuffled and a card is drawn at random. Find the probability that it is a 1) face card 2) black card.
15. Find the value of x for which the distance between the points P (2,-3) and Q (x,5) is 10 units.

### SECTION D

16. Prove that  $3 - \sqrt{2}$  is irrational.
17. Draw the graph of equations  $x+y=3$  and  $2x+5y=12$ . Does their point of intersection lie on the x-axis? Find the area of the triangle formed by these lines and the line  $y=0$ .
18. Solve following for x and y  
 $(a-b)x + (a+b)y = a^2 - 2ab - b^2$   
 $(a+b)(x+y) = a^2 + b^2$

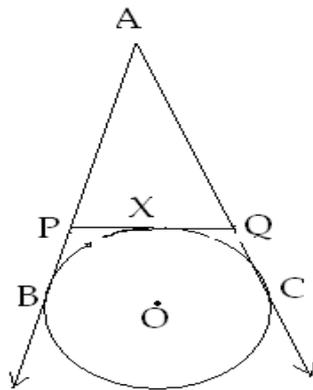
OR

Solve the pair of linear equations for x and y

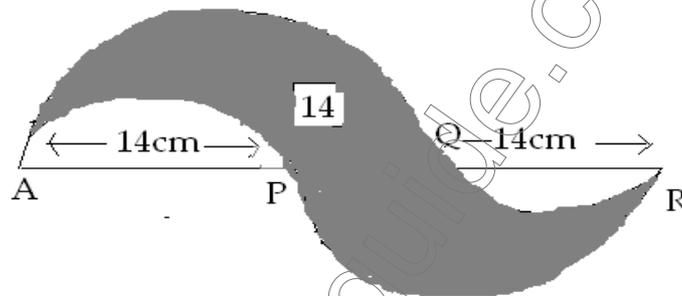
$$47x + 53y = 41$$

$$53x + 47y = 59$$

19. The sum of first n terms an A.P is  $3n^2 + n$ . Find the A.P and also the  $n^{\text{th}}$  term. **OR**  
 Find the sum of all three digit number which leave remainder 3 when divided by 5.
- 20 Prove that  $\frac{\sqrt{\sec A - 1}}{\sqrt{\sec A + 1}} + \frac{\sqrt{\sec A + 1}}{\sqrt{\sec A - 1}} = 2 \operatorname{cosec} A$
21. Find out if the points A (-3,2), B (1,-3) and C (4,1) are the vertices of an isosceles right triangle?
22. In what ratio does the points P (2,-5) divide the line segment joining A (-3,5) and B (4,-9).
- 23 Construct a right angled  $\triangle ABC$  right angled at B with  $AB = 4\text{cms}$  and  $BC = 6\text{cms}$ . Now draw a circle with AB as diameter. From C, draw tangents to this circle. **OR**  
 Construct a right angled  $\triangle ABC$  in which  $AB = 4\text{cms}$ ,  $BC = 6\text{cms}$  and  $\angle ABC = 60^\circ$  such that each side of new triangle is  $\frac{4}{3}$  of the corresponding side of  $\triangle ABC$
24. In the given figure, AB, AC and PQ are tangents to a circle and  $AB = 5\text{ cm}$ . Find the perimeter of  $\triangle APQ$ .



25. Find the area and perimeter of the shaded region in figure given below, where  $AP=PQ=QR=14$  cm.

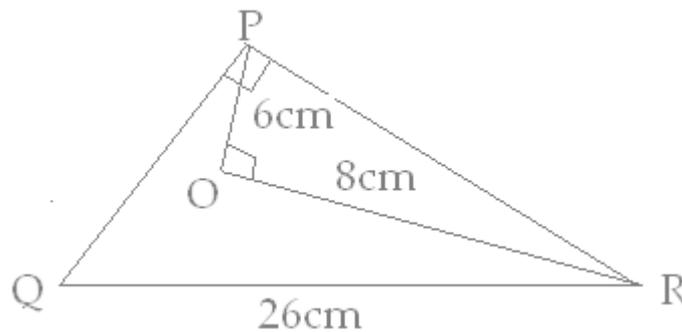


26. Find the mean, mode and median of the following data.

CLASS	FREQUENCY
0-10	5
10-20	10
20-30	18
30-40	30
40-50	20
50-60	12
60-70	5

27. In a right angled triangle, prove that the square on the hypotenuse is equal to the sum of the squares on other two sides. Prove.

Using the above, in the given figure, find the length of PQ if angle  $QPR = \text{angle } POR = 90^\circ$   
 $OP = 6$  cm,  $OR = 8$  cm and  $QR = 26$  cm



28. Two ships sailing on the sea are on either side of the light house. The angles of depression of the two ships as observed from the top of the light house are  $60^\circ$  and  $45^\circ$  respectively. If the distance between the two ships is  $200 \left( \frac{\sqrt{3} + 1}{\sqrt{3}} \right)$  m, find the

height of the light house.

**OR**

From the top of the tower, the angles of depression of two object on the same side of tower are  $a$  &  $B$ , (where  $a > B$ ). If the distance between the objects are  $x$  m, show that

height of the tower is  $\left( \frac{x \tan a \tan b}{\tan a - \tan b} \right)$  m

29. A group of girls planned a picnic. The budget for food was Rs.2400. Due to illness, 10 girls couldn't go to the picnic and cost of food for each girl increased by Rs.8. How many girls had planned for picnic?

**OR**

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

30. The slant height of a frustum of a cone is 4cm and the perimeters of its circular ends are 18cm and 6cm. Find the curved surface area of the frustum.