Test Paper

Time : 3 hours **Mathematics Class – X^{th}** **Marks : 80**

Section - A comprises of 10 questions of 01 marks each.
Section - B comprises of 05 questions of 02 marks each.
Section - C comprises of 10 questions of 03 marks each.
Section - D comprises of 05 questions of 06 marks each.

Section – A

1. State the fundamental theorem of arithmetic .
2. Express tan A in terms of sin A .
3. Which term of the sequence -54,-50,-46,-42 , ……. is the first positive term ?
4. For what value of K the quadratic equation x^2-Kx+4=0 have imaginary roots ?
5. Find the perimeter of a sector of a circle of radius 12.5 cm and angle 45° .
6. A bag contains 15 balls in which x balls are blue and remaining are red . If the probability of getting a blue ball is twice the probability of getting a red ball ,then find the value of x ,also find the probability of getting a red ball ?
7. Derive the formula for mid point of a line segment with end points (x_1,y_1) and (x_2,y_2) .
8. Write the relationship between Mean , Mode and Median .
9. 2x+3y=7 and 6x+5y=11
   Determine whether the given system of equation has consistent solution or not and also determine the type of line shows by the given system of equation on the graph without plotting it ?
10. Prove that the length of two tangents drawn from an external point to a circle are equal ?

Section –B

11. How many terms of series 54,51,48,……. be taken so that there sum is 513 ? Explain the double answer.
12. Without using trigonometric tables, evaluate the following ?
    $\frac{\cos^2 20^\circ+\cos^2 70^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 2\csc^2 58^\circ - 2\cot 58^\circ \tan 32^\circ - 4\tan 13^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ \tan 37^\circ$
13. Determine the ratio in which the line 3x+y-9=0 divides the segment joining the points (1,3)and (2,7). Find the co-ordinate of intersection point .

14. Three coins are tossed together . Find the probability of getting :-
    i) exactly two head ii) at most one tail
    iii) at least one head iv) at least one head and one tail

OR

A card is drawn at random from a pack of 52 cards . Find the probability that the card drawn is
i) neither a red card nor a queen ii) other than an ace
iii) either a black card or a king iv) a jack ,queen or a king

15. A triangle ABC in which B is an acute angle and AD perpendicular to BC . Prove that

$$AC^2=AB^2+BC^2+2(BC*BD)$$

Section – C

16. Find the value of a and b so that $x^4+x^3+8x^2+ax+b$ is divisible by x^2+1 .

17. Find the sum of all three digit odd numbers divisible by 3 .

18. Seven years ago Varun's age was five times the square of Swati's age . Three years hence Swati's age will be two fifth of Varun's age . find their present age's .

19. Draw the graph of the following equations :

$$2x-y-2=0 \ , \ 4x+3y-24=0 \ \text{ and } \ y+4=0$$

Obtain the vertices of the triangle ?

20. Prove the following identities:

$$(1+\tan^2A) + (1+ 1/\cot^2A) \quad = \quad 1 \ /(\sin^2A -\sin^4A)$$

OR

$$\frac{\tan^2A}{1+\tan^2A} + \frac{\cot^2A}{1+ \cot^2A} = 1$$

21. The four vertices of a quadrilateral are (1 , 2) , (-5 , 6) , (7 , -4) and (k , -2) taken in order . If the area of the quadrilateral is zero , find the value of k ?

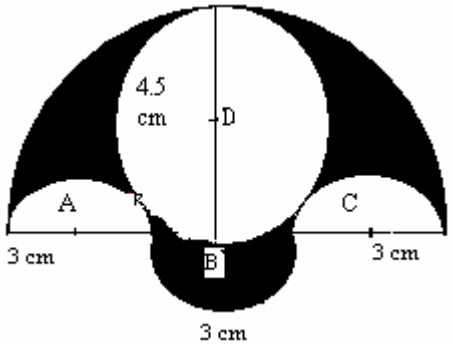
22. Find the coordinate of the centre of the circle passing through the points (0 ,0) , (-2 , 1) and (-3 , 2) also , find its radius .

23. After covering a distance of 30 km with a uniform speed there is some defect in a train engine and therefore , its speed is reduced to 4/5 of its original speed . Consequently the train reaches its destination late by 45 minutes . Had it happened after covering 18 km more , the train would have reached 9 minutes earlier . Find the speed of the train and the distance of journey .

OR

A takes 10 days less than the time taken by B to finish a piece of work . If both A and B together can finish the work in 12 days , Find the time taken by B to finish the work .

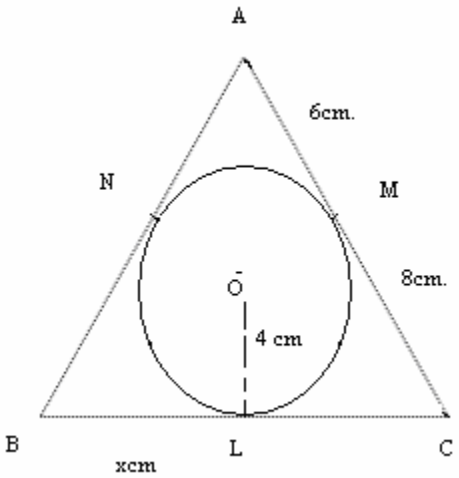
24. In figure , there are three semicircle A , B and C having diameter 3cm each and another semicircle E having a circle D with diameter 4.5 cm are shown . Calculate the area of shaded region ?



25. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° .

Section – D

26. Find the length of three sides of triangle in given figure .



27. A straight highway leads to the foot of a tower .A man standing at the top of the tower Observes a car at angle of depression of 30 , which is approaching to the foot of the tower with a uniform speed . 6 second later the angle of depression of the car is found to be 60 . find the further time taken by the car to reach the foot of the tower .

OR

from the top of a light house , the angle of depression of two ships on the opposite sides of it are observed to be α and β . if the height of the light house be h metres and line joining the ships passes through the foot of the light house , show that the distance between the ships is

$$\frac{h\ (\tan\alpha + \tan\beta)}{\tan\alpha \tan\beta} \text{ metres}$$

28. A hollow cone is cut by a plane parallel to the base and the upper portion is removed . if the curved Surface of the remainder is 8/9 of the curved surface of the whole cone . find the ratio of the line Segment into which the cone's , altitude is divided by the plane .

29. The median of the following data is 525 . Find the values of x and y , if the total frequency is 100.

Class interval	Frequency
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	y
700-800	9
800-900	7
900-1000	4

30. Prove that the ratio of the areas of two similar triangles one equal to the ratio of the squares of any Two corresponding sides.

Use the above theorem, Prove that the area of the equilateral triangle described on the side of a Square is half the area of the equilateral triangle described on its diagonal.

OR

State and prove Pythagoras theorem.

P and Q are the mid point of the sides CA and CB respectively of a triangle ABC, right angled at C. Prove that $4(AQ^2 + BP^2) = 5\ AB^2$

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TUTIONS FOR MATHS

FOR CLASS UPTO XIITH

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