

HOLY MISSION HIGH SCHOOL

[Affiliated to C.B.S.E, Delhi, +2 Level]

SAMASTIPUR - 848101

Std.- X

Subject:- Maths

F.M. - 80

Time : 3 hrs.

General Instruction:-

Attempt all the questions

Q. No. 1 to 6 carry 1 mark each

Q. No. 7 to 12 carry 2 marks each

Q. No. 13 to 22 carry 3 marks each

Q. No. 23 to 30 carry 4 marks each

GROUP - A

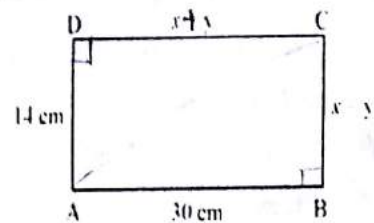
6x1=6

1. What is the HCF of smallest prime number and the smallest composite number?
2. Find the distance of a point p(x,y) from the origin.
3. What is the value of $(\cos^2 67^\circ - \sin^2 23^\circ)$?
4. Given $\Delta ABC \sim \Delta PQR$, if $\frac{AB}{PQ} = \frac{3}{4}$ then find $\frac{\text{ar}(\Delta ABC)}{\text{ar}(\Delta PQR)}$
5. If α and β are the zeros of $x^2 + 5x + 8$, then find $\frac{1}{\alpha} + \frac{1}{\beta}$
6. Construction of a cumulative frequency table is useful in determining the

GROUP - B

6x2=12

7. Given that $\sqrt{2}$ is irrational, prove that $5 + 3\sqrt{2}$ is an irrational number.
 8. ABCD is a rectangle. Find the values of x and y.
- Find the ratio in which P(4,m) divides the line segment joining the points A(2,3) and B(6,-3). Hence find m.



10. Find the quadratic polynomial where sum and product of the zero are $\frac{1}{4}$ and -1 respectively.
11. If the values of mean and mode are respectively 30 and 15, then find median.
12. ABC is an isosceles right triangle right angled at C. Prove that $AB^2 = 2AC^2$.

GROUP - C

10x3=30

13. Find HCF and LCM of 404 and 96 verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.

P.T.O

14. Find all zeros of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$ if two of its zeros are $2 + \sqrt{3}$ and $2 - \sqrt{3}$.
15. If $A(-5,7)$, $B(-4,-5)$, $C(-1,-6)$ and $D(4,5)$ are the vertices of a quadrilateral. Find the areas of the quadrilateral ABCD.
16. If the area of two similar triangles are equal, prove that they are congruent.
17. If $4 \tan \theta = 3$, evaluate $\frac{4 \sin \theta - \cos \theta + 1}{4 \sin \theta + \cos \theta - 1}$
18. If $\tan 2A = \cot (A - 18^\circ)$, where $2A$ is an acute angle, find the value of A
19. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.
20. In a ΔABC , $\angle C = 3 \angle B = 2(\angle A + \angle B)$, find three angles.
21. Prove that the line joining the midpoints of any two sides of a triangle is parallel to the third side.

22. Find mean of the following distribution :-

C.I	50-52	53-55	56-58	59-61	62-64
Frequency	12	14	8	6	10

GROUP - D

8x4=32

23. Prove that in a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.
24. Prove that $\frac{\sin A - 2 \sin^3 A}{2 \cos^3 A - \cos A} = \tan A$.
25. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.
26. Find a point on the y-axis which is equidistant from the points $A(6,5)$ and $B(-4,3)$
27. Check whether the pair of equation $x + 3y = 6$ and $2x - 3y = 12$ is consistent. If so, solve then graphically.
28. Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$.
29. Use Euclid division lemma to show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m .

Handwritten work for question 25:

$$\frac{30}{x} + \frac{44}{2+x} = 10$$

$$\frac{40}{x} + \frac{55}{2+x} = 13$$

Subtracting the two equations:

$$\frac{30}{x} - \frac{40}{x} + \frac{44}{2+x} - \frac{55}{2+x} = 10 - 13$$

$$-\frac{10}{x} - \frac{11}{2+x} = -3$$

$$\frac{10}{x} + \frac{11}{2+x} = 3$$

$$\frac{10(2+x) + 11x}{x(2+x)} = 3$$

$$\frac{20 + 10x + 11x}{x(2+x)} = 3$$

$$\frac{20 + 21x}{x(2+x)} = 3$$

$$20 + 21x = 3x(2+x)$$

$$20 + 21x = 6x + 3x^2$$

$$3x^2 - 15x - 20 = 0$$

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30. 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

$$\begin{array}{r}
 850 \\
 4200 \\
 \hline
 5050 \\
 7650 \\
 \hline
 12700 \\
 9100 \\
 \hline
 3800 \\
 6750 \\
 \hline
 20550
 \end{array}$$

$$\frac{30}{x-y} + \frac{44}{x+y} = 10$$

$$\frac{40}{x-y} + \frac{55}{x+y} = 13$$

$$\text{Let } \frac{1}{x-y} = a = \frac{1}{x+y} = b$$

$$30a + 44b = 10$$

$$40a + 55b = 13$$