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MM 90

Mock Test X

Time 3 hours

Paper prepared by **Dev Anoop**,

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Section A 1 Mark Each

1. If $(x - 1)$ and $(x + 3)$ are the factors of $x^3 + 3x^2 - x - 3$. Then the third factor is
(A) $x + 1$ (B) $x - 1$ (C) $x + 3$ (D) $x - 2$
2. If ΔABC is a right triangle, right angled at B and P and Q are midpoints of AB and AC respectively, then $4(AP^2 + CQ^2)$ is equal to
(A) $4 AC^2$ (B) $5 AC^2$ (C) $6 AC^2$ (D) $1.25 AC^2$
3. If $\sin 3\theta = \cos(\theta - 6^\circ)$, where 3θ and $\theta - 6^\circ$ are both acute angles, then $\theta =$
(A) 18° (B) 24° (C) 36° (D) 30°
4. If $\cos(\theta + \Phi) = 0$ then $\sin(\theta - \Phi)$ can be reduced to
(A) $\cos \theta$ (B) $\cos 2\Phi$ (C) $\sin \Phi$ (D) none of these
5. The polynomial _____ is not formed by zeros 4 and - 5
(A) $x^2 + x - 20$ (B) $2x^2 + 2x - 40$ (C) $3x^2 + 3x - 60$ (D) $2x^2 - 2x + 40$
6. The pair of linear equations $5x + 7y = 3$, $7x + 5y = 4$
(A) One solution (B) Two solutions
(C) In. Many solutions (D) No solution
7. $\sin^4 \theta - \cos^4 \theta =$
(A) $\sin^2 \theta - \cos^2 \theta$ (B) $2 \sin^2 \theta - 1$ (C) $1 - 2\cos^2 \theta$ (D) all of these
8. HCF of two numbers is 35, LCM cannot be
(A) 1750 (B) 700 (C) 105 (D) 65

Section B 2 Marks Each

9. Is $13 \times 11 \times 5 \times 3 + 13 \times 11 \times 5$ a composite number? Justify your answer.
10. Can the quadratic polynomial $x^2 + bx + b$ have equal zeros for some odd integer $b > 1$
11. In ΔABC , D and E are points on sides AB and AC respectively such that $\angle ADE = \angle C$. Is $\Delta ADE \sim \Delta ACB$? Why?
12. If $7 \sin^2 \theta + 3 \cos^2 \theta = 4$, show $\cot \theta = \sqrt{3}$
13. Show 6^n cannot end in zero where n is a positive integer.

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14. The following distribution gives the daily income of 50 workers of a factory. Write it as more than type cumulative frequency distribution.

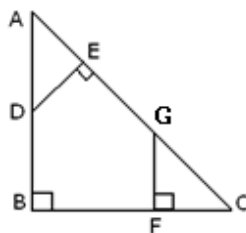
Daily income (in Rs)	100-120	120-140	140-160	160-180
Number of workers	12	14	8	6

Section C 3 Marks Each

15. A person rowing a boat at the rate of 5km/hour in still water, he takes thrice as much time in going 40km upstream as in going 40 km downstream. Find the speed of stream.
16. If $\tan A + \sin A = m$, $\tan A - \sin A = n$ then show that $m^2 - n^2 = 4\sqrt{mn}$
17. Show that $\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$
18. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$
19. ABC is a triangle right angled at C, p is the length of the perpendicular from C to AB and $AB = c$, $BC = a$, $CA = b$. Show $pc = ab$ and $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

or

In fig., $AB \perp BC$, $FG \perp BC$ and $DE \perp AC$. Prove that $\triangle ADE \sim \triangle GCF$



20. ABC is a right triangle right angled at B. D and E be points on AB and BC respectively. Prove that $AE^2 + CD^2 = AC^2 + DE^2$
21. Find k for infinitely many solutions $kx + 3y - (k - 3) = 0$, $12x + ky - k = 0$.
22. Points A and B are 90 km apart from each other on a highway. A car starts from A and other from B at the same time. If they go in same direction they meet in 9 hours and if they go in opposite directions they meet in $9/7$ hours. Find their speeds.
23. Find other zeroes of the polynomial $p(x) = 2x^4 + 7x^3 - 19x^2 - 14x + 30$ if one of its zeroes is $\sqrt{2}$



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24. Find the median of the following data

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	3	4	3	3	4	7

Section D 4 Marks Each

25. Determine graphically co-ordinates of the vertices of triangle, the equations of whose sides are $2x - 3y = 2$, $x = -1$, $x + 2y = 8$

26. Prove that $\sqrt{7}$ is irrational.

27. Show that there is no positive integer for which $\sqrt{r-1} + \sqrt{r+1}$ is rational.

Or

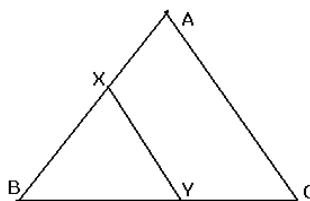
Find HCF of 850, 680 and 510 using Euclid's division algorithm, also find LCM.

28. State and prove converse of Pythagoras Theorem.

29. Prove that: $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$

30. If $\sec \theta + \tan \theta = p$, prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$

31. In ΔABC , line segment $XY \parallel AC$, XY divides triangular region ABC into two parts equal in area. Determine $\frac{AX}{AB}$



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32. Draw an less than and more than ogive from the following data and find out the median wage:

Wages (Rs.)	0-20	20-40	40-60	60-80	80-100
No. of workers	8	9	12	6	1

33. The mean of the following data is 53. Find missing frequencies x and y.

Age (in years)	0-20	20-40	40-60	60-80	80-100	total
No. of people	15	x	21	y	17	100

34. Find the mode of the data

X	0-20	20-40	40-60	60-80	80-100	100-120
F	8	20	30	15	17	8

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