



MM 90

Mathematics Mock Test class X 2014

Time 3 hours

Questions 1- 4 carry 1 mark each, 5 - 10 carry 2 marks each, 11 - 20 carry 3 marks each and 21 - 31 carry 4 marks each.

Section A

1. A positive integer n when divided by 9, given 7 as remainder. What will be remainder when $(3n - 1)$ is divided by 9?
2. In triangle PQR, S and T are points on sides PQ and PR respectively such that $ST \parallel QR$. If $PS = 4\text{cm}$, $PQ = 9\text{cm}$ and $PR = 4.5\text{ cm}$. Find PT.
3. Find zeroes of the polynomial $5x^2 + 25x$.
4. Write empirical relation connecting mean, mode and median.

Section B

5. Find k for intersecting lines: $2x + 3y = 9$ and $5x + ky = 15$
6. Diagonals AC and BD of trapezium ABCD intersect at O. If $AB \parallel CD$, show diagonals divide each other in same ratio.
7. Given $\sin \theta = \frac{a}{b}$, evaluate $\sec \theta$
8. On dividing the polynomial $4x^3 + 8x^2 + 5x + 6$ by a polynomial $g(x)$, the quotient and the remainder were $4x$ and $6 - 3x$ respectively. Find $g(x)$.
9. Given $\tan (A + B) = \sqrt{3}$ and $\tan (A - B) = \frac{1}{\sqrt{3}}$, find A and B
10. Find mode of the following distribution:

Class	0-30	30-60	60-90	90-120	120-150
Frequency	12	40	42	33	10

Section C

11. The HCF of 65 and 117 is expressible in the form $65m - 117$. Find the value of m . Also, find the LCM of 65 and 117 using prime factorization.
12. α and β are zeros of polynomial $x^2 - 6x + a$. Find a if $3\alpha + 2\beta = 20$
13. The sum of the digits of a two digit number is 8 and the difference between the number and that formed by reversing the order of digits is 18. Find the number.

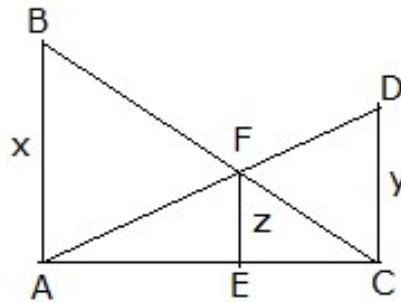


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14. In figure $AB \perp AC$, $EF \perp AC$, $CD \perp AC$, prove that $\frac{1}{z} = \frac{1}{x} + \frac{1}{y}$



15. Given that $\sin A + 2\cos A = 1$, then prove that $2\sin A - \cos A = 2$.
16. Find the mean of the following distribution using step deviation method:

Class	20-30	30-40	40-50	50-60	60-70
Frequency	25	40	42	33	10

17. Find HCF of 180, 252 and 324 using Euclid's division algorithm.
18. If P and Q are midpoints of sides CA and CB respectively of triangle ABC, right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$
19. The median class of a frequency distribution is 125-145. The frequency and cumulative frequency of the class preceding to the median class are 20 and 22 respectively. Find the sum of the frequencies, if the median is 17.
20. If $\sin \theta = \frac{c}{\sqrt{c^2 + d^2}}$ and $d > 0$, find $\cos \theta$, $\tan \theta$

Or

Is $\sin A = \sin B$, prove $\angle A = \angle B$

Section D

21. State and prove Pythagoras theorem
22. Draw the graph of following equations $2x + y = 6$ and $4x - 2y = 4$. Find solution and the area of triangle formed by these lines and y-axis.



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23. Find all the zeros of the polynomial $x^4 - 3x^3 - x^2 + 9x - 6$ if two of its zeros are $\pm\sqrt{3}$

Or

Vishal donated some books and pens to a school for poor children. Books and pens can be represented by zeroes p and q of polynomial $x^2 - x - 2$. Vishal's brother Prince is inspired by him. He also donates books and pens in form of a polynomial whose zeroes are $1 + 2p$ and $1 + 2q$. Find the polynomial represented by Prince's donation. Why Prince got inspired by Vishal?

24. Prove $\sqrt{7}$ is irrational.

Or

(a) Without actually performing long division, state why $\frac{543}{225}$ has a non-terminating recurring decimal expansion.

(b) Show that the square of any positive integer is of the form $4q$ or $4q + 1$ for some integer q .

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

26. The students in a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row there would be 2 more rows. Find the number of students in class. Why does the teacher emphasize the students to stand in rows?

Or

For which value (s) of λ , do the pair of linear equations $\lambda x + y = \lambda^2$ and $x + \lambda y = 1$ have
(i) No solution (ii) Infinitely many solutions (iii) A unique solution

27. Prove $\frac{1}{\operatorname{cosec}A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\operatorname{cosec}A + \cot A}$

Or

Find values of $\sin 75^\circ$ and $\cos 75^\circ$, given $\sin(\theta + \beta) = \sin\theta \cos\beta + \cos\theta \sin\beta$ and $\cos(\theta + \beta) = \cos\theta \cos\beta - \sin\theta \sin\beta$



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28. In $\triangle ABC$, D and E are points on sides AB and AC such that $DE \parallel BC$. Prove median AN bisects DE.

Or

In an equilateral triangle ABC, D is a point on side BC such that $3BD = BC$. Prove that $9AD^2 = 7AB^2$

29. The following table shows the marks obtained by 100 students of class X in a school during a particular academic session. Draw Ogive and find median from it.

Marks Less than or equal to	10	20	30	40	50	60	70
No. of Students	7	21	34	46	66	77	92

30. In $\triangle ABC$, from A and B perpendiculars AD and BE are drawn to sides BC and AC respectively. Prove that $\triangle ADC \sim \triangle BEC$. Is $\triangle ADB \sim \triangle AEB$ and $\triangle ADB \sim \triangle ADC$?

31. Mean of following frequency table is 53. Find x and y

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	15	x	21	y	17	100

Or

- (a) Write one disadvantage of mean.
- (b) The mean of six observations $x + 6, x - 6, x, x + 8, x + 12, x - 2$ and is 26, find the observations.
- (c) Which measure of central tendency is given by the x-coordinate of the point of intersection of more than Ogive and less than type Ogive.