

MODEL PRACTICE PAPERS

MODEL TEST PAPER

FIRST TERM (SA-I)

MATHEMATICS

(With Answers)

CLASS X

Time Allowed: 3 to 3½ Hours

Maximum Marks: 80

General Instructions :

- All questions are compulsory.
- The question paper consists of 34 questions divided into four sections A, B, C and D. Section A comprises of 10 questions of 1 mark each, Section B comprises of 8 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and Section D comprises of 6 questions of 4 marks each.
- Question numbers 1 to 10 in Section A are multiple choice questions where you are to select one correct option out of the given four.
- There is no overall choice. However, internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

Section 'A'

Question numbers 1 to 10 are of one mark each.

1. The decimal expansion of the rational number $\frac{63}{2^4 \cdot 5^3}$ will terminate after how many

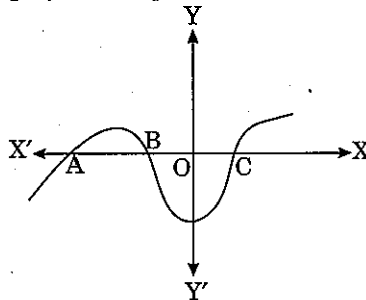
places of decimals ?

- (a) 1 (b) 2
(c) 3 (d) 4

2. [HCF \times LCM] for the numbers 45 and 117 is

- (a) 3165 (b) 3265
(c) 3365 (d) 3065

3. In figure, the graph of a polynomial $p(x)$ is shown. The number of zeroes of $p(x)$ is



- (a) 1 (b) 2
(c) 3 (d) 4

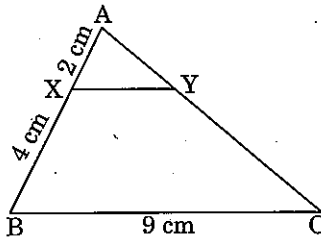
4. The pair of linear equations :

$$x + 4y - 8 = 0$$

$$3x + 12y = 24$$

have

- (a) one solution (b) two solutions
(c) many solutions (d) no solution
5. In figure, $XY \parallel BC$, then the length of XY is



- (a) 3 cm (b) 4 cm
(c) 2 cm (d) 5 cm

6. If $\cos A = \frac{3}{5}$, then the value of $9 \cot^2 A - 1$ is

- (a) $\frac{64}{25}$ (b) $\frac{65}{16}$
(c) $\frac{16}{65}$ (d) $\frac{63}{25}$

7. If $\cot \theta + \frac{1}{\cot \theta} = 2$, then the value of $\cot^2 \theta + \frac{1}{\cot^2 \theta}$ is

- (a) 3 (b) 2
(c) 4 (d) -4

8. If $\sin B = \frac{1}{2}$, then the value of $3 \cos B - 4 \cos^3 B$ is

- (a) 0 (b) 1
(c) -1 (d) 2

9. If $\tan 2A = \cot (A - 18^\circ)$, where $2A$ is an acute angle, then the value of A is

- (a) 32° (b) 33°
(c) 34° (d) 36°

10. Which measure of central tendency is given by the x -coordinate of the point of intersection of 'more than ogive' and 'less than ogive'?

- (a) Median (b) Mean
(c) Mode (d) Mean and Mode both.

Section 'B'

Question numbers 11 to 18 carry 2 marks each.

11. Is $11 \times 7 \times 5 \times 3 + 5$ a composite number. Justify your answer.

12. If the polynomial $4x^4 + 2x^3 - 2x^2 + x - 1$ is divided by another polynomial $x^2 + 2x - 3$, the remainder comes out to be $ax + b$. Find the values of a and b .

13. Solve the following system of equations :

$$\frac{2x}{a} + \frac{y}{b} = 2$$

and
$$\frac{x}{a} - \frac{y}{b} = 4.$$

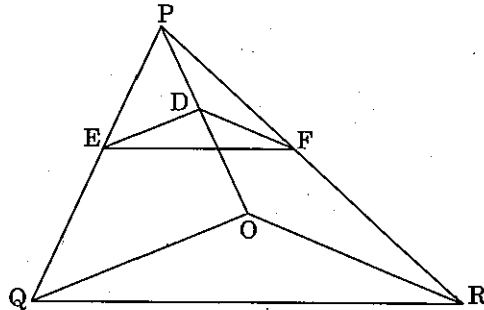
14. If $\tan \theta = \frac{20}{21}$, evaluate $\frac{1 - \sin \theta + \cos \theta}{1 + \sin \theta + \cos \theta}$.

Or

Prove that :

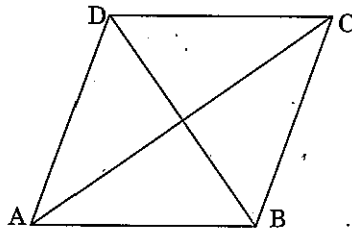
$$(1 + \cot^2 \theta)(1 - \cos \theta)(1 + \cos \theta) = 1$$

15. In the figure, $DE \parallel OQ$ and $DF \parallel OR$, show that $EF \parallel QR$.



16. In the figure, $ABCD$ is a rhombus. Prove that

$$4AB^2 = AC^2 + BD^2.$$



17. Given below is the distribution of marks obtained by 229 students :

Marks	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	Total
No. of students	12	30	34	65	45	25	18	229

Write the above distribution as more than type cumulative frequency distribution.

18. The length of 42 leaves of a plant are measured correct up to the nearest millimetre and the data is as under :

Length (in mm)	118 - 126	126 - 134	134 - 142	142 - 150	150 - 158	158 - 166
Number of leaves	4	5	10	14	4	5

Find the mode length of the leaves.

Section 'C'

Question numbers 19 to 28 carry 3 marks each.

19. Prove that the square of any positive integer is of the form $3m$ or $3m + 1$ but not of the form $3m + 2$.

20. Show that $5 - \sqrt{3}$ is irrational.

Or

Prove that $\frac{7\sqrt{2}}{9}$ is irrational.

21. For what value of k , the following pair of linear equations has infinitely many solutions ?

$$\begin{aligned} 2x - 3y &= 7 \\ (k + 2)x - (2k + 1)y &= 21 \end{aligned}$$

Or

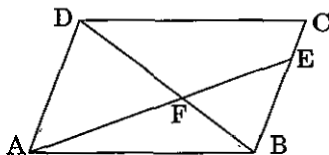
Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Find the number of students in the class.

22. If α and β are zeroes of the polynomial : $p(x) = x^2 - 2x + 3$, find a quadratic polynomial whose zeroes are $\alpha + 2$ and $\beta + 2$.

23. Prove that : $\frac{1 + \sin A}{\cos A} + \frac{\cos A}{1 + \sin A} = 2 \sec A$.

24. Prove that : $\frac{\cos \theta}{\tan \theta + \sec \theta} = 2 + \frac{\cos \theta}{\tan \theta - \sec \theta}$

25. In figure, the diagonal BD of a parallelogram $ABCD$ intersects the segment AE at F , where E is any point on the side BC . Prove that $DF \times EF = FB \times FA$.



26. In $\triangle ABC$, if AD is the median, show that $AB^2 + AC^2 = 2(AD^2 + BD^2)$.

27. Find mean of the following frequency distribution using step-deviation method :

Class interval	0 - 60	60 - 120	120 - 180	180 - 240	240 - 300
Frequency	22	35	44	25	24

Or

From the data given below, find the value of p , if the mean is 330.

Loss per Shop (in ₹)	0 - 100	100 - 200	200 - 300	300 - 400	400 - 500	500 - 600
No. of Shops	10	15	30	p	25	20

28. Find the median of the following data :

Age (in years)	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60
No. of Persons	50	70	100	180	150	120	70	59

Section 'D'

Question numbers 29 to 34 carry 4 marks each.

29. If two zeroes of the polynomial $x^4 + x^3 - 15x^2 - 29x - 6$ are $2 \pm \sqrt{5}$, find other zeroes.

30. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Or

Prove that in a right angle triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

31. Prove that

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

Or

Evaluate :

$$\frac{\sin 38^\circ}{\cos 52^\circ} + 2 \tan 11^\circ \tan 31^\circ \tan 45^\circ \tan 59^\circ \tan 79^\circ - \frac{3(\sin^2 25^\circ + \sin^2 65^\circ)}{\cos^2 40^\circ + \cos^2 50^\circ}$$

32. If $x = \tan A + \sin A$ and $y = \tan A - \sin A$, show that $x^2 - y^2 = 4\sqrt{xy}$.

33. Solve the following system of linear equations graphically :

$$5x - 6y + 30 = 0$$

and $5x + 4y - 20 = 0$

Also find the vertices of the triangle formed by the above two lines and x -axis.

34. 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

ANSWERS**Section 'A'**

- | | | |
|---------|--------|--------|
| 1. (d) | 2. (b) | 3. (c) |
| 4. (c) | 5. (a) | 6. (b) |
| 7. (b) | 8. (a) | 9. (d) |
| 10. (a) | | |

Section 'B'

11. Yes, Number = $232 \times 5 = 2^3 \times 5 \times 29$

12. $a = -25, b = 65$

13. $x = 2a$ and $y = -2b$

14. $\frac{3}{7}$

17.

Marks more than	Cumulative frequency (cf)
10	229
20	217
30	187
40	153
50	88
60	43
70	18

18. Mode = 144.29 mm.

Section 'C'

21. $k = 4$ Or Total number of students = 60

22. $p(x) = k(x^2 - 6x + 11)$, where k is constant.

27. Mean = 147.6 Or $p = 25$

28. Median = 39.9 years

Section 'D'

29. Other zeroes are -3 and -2 .

31. Or 0

33. $x = 0$ and $y = 5$; Vertices of Δ are $(-6, 0)$, $(0, 5)$, $(4, 0)$.

34. $x = 9$ and $y = 15$