

Mathematics

Summative Assessment - I

(Class - X)

(Set - 8)

Time allowed: 3 hours

Maximum Marks: 90

General Instructions:

- All questions are compulsory.
- The question paper comprises of 31 questions divided into four sections A, B, C and D. You are to attempt all the four sections.
- Questions 1 to 4 in section A are one mark questions.
- Questions 5 to 10 in section B are two marks questions.
- Questions 11 to 20 in section C are three marks questions.
- Questions 21 to 31 in section D are four marks questions.
- There is no overall choice in the question paper. Use of calculators is not permitted.

SECTION – A

- The decimal expansion of the rational number $\frac{43}{2^4 \times 5^3}$ will terminate after how many places of decimals?
- The area of the triangle formed by the lines $y = x$, $x = 6$ and $y = 0$ is
 - 36 sq.units
 - 18 sq.units
 - 9 sq.units
 - 72 sq.units
- If $am \neq bl$, then the system of equations

$$ax + by = c$$

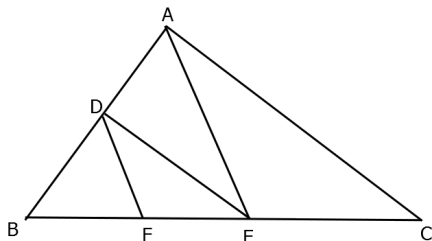
$$lx + my = n$$
 - has a unique solution
 - has no solution
 - has infinitely many solutions
 - may or may not have a solution
- If the arithmetic mean of x , $x + 3$, $x + 6$, $x + 9$ and $x + 12$ is 10, then $x =$
 - 1
 - 2
 - 6
 - 4

SECTION – B

- What can you say about the prime factorisation of the denominators of the rational number $\overline{27.142857}$.
- If $(x + a)$ is a factor of $2x^2 + 2ax + 5x + 10$, find a .
- If $\sec 2\theta (1 + \sin\theta)(1 - \sin\theta) = k$, then find the value of k .

8. In a ΔABC , $\angle A = 90^\circ$, $AB = 5$ cm and $AC = 12$ cm. If $AD \perp BC$, then find AD .

9. In the given figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{EF}{BF} = \frac{EC}{BE}$.



10. Find the mode of the following frequency distribution:

Size of items:	0-4	4-8	8-12	12-16	16-20
Frequency:	5	7	9	17	12

SECTION - C

11. If $\tan\theta = \frac{r}{s}$, find the value of $\frac{r \sin\theta - s \cos\theta}{r \sin\theta + s \cos\theta}$.

12. In a triangle PQR, right angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Find the values of $\sin P$, $\cos P$ and $\tan P$.

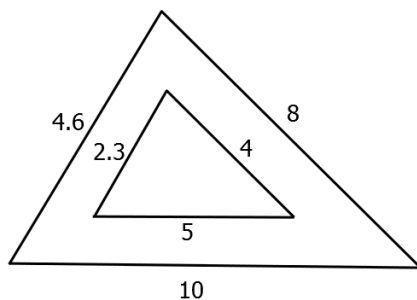
13. If the mean of the following distribution is 54, find the value of p .

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	p	10	9	13

14. Prove that the roots of the equation $(a - b + c)x^2 + 2(a - b)x + (a - b - c) = 0$ are real.

15. Find the fraction which becomes $\frac{2}{3}$ when the numerator is increased by 2 and equal to $\frac{4}{7}$ when the denominator is increased by 4.

16. In the following figure, find whether the triangles are similar. Give reasons in support of your answer.



17. In an equilateral triangle with side a , prove that altitude is $\frac{a\sqrt{3}}{2}$ and area is $\frac{\sqrt{3}}{4}a^2$.
18. Check whether the first polynomial is a factor of the second polynomial by applying the division algorithm.
- $t^2 - 3; \quad 2t^4 + 3t^3 - 2t^2 - 9t - 12$
19. If $\sin\theta + \cos\theta = \sqrt{2} \sin(90^\circ - \theta)$, determine $\cot\theta$.
20. Find the mean marks of the students from the following cumulative frequency distribution:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80	Below 90	Below 100
No. of students	5	9	17	29	45	60	70	78	83	85

SECTION - D

21. Form the pair of linear equations in the following problem and find its solution graphically. 20 students of a class took part in Science quiz. If the number of girls is 6 more than boys, find the number of boys and girls who took part in the quiz.
22. The median of the following data is 525. Find the values of x and y , if the total frequency is 100.

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

23. If $\sec\theta = x + \frac{1}{4x}$, prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$.
24. The following table shows the ages of the patients admitted in a hospital during a year:

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of students	6	11	21	23	14	5

Find the mode and the mean of the data given above. Compare and interpret the two measures of central tendency.

25. If the polynomial $f(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $x + a$. Find the value of k and a .

26. If $\cos\theta + \cos^2\theta = 1$, prove that
 $\sin^{12}\theta + 3\sin^{10}\theta + 3\sin^8\theta + \sin^6\theta + 2\sin^4\theta + 2\sin^2\theta - 2 = 1$
27. The perpendicular AD on the base BC of a ΔABC intersects BC at D so that $DB = 3CD$. Prove that $2AB^2 = 2AC^2 + BC^2$.
28. Prove that in an equilateral triangle, three times the square of a side is equal to four times the square of its altitudes.
29. If $2\theta + 45^\circ$ and $30^\circ - \theta$ are acute angles, find the degree measure of θ satisfying
 $\sin(2\theta + 45^\circ) = \cos(30^\circ - \theta)$.
30. Solve the following system of equations graphically
 $x + 3y = 6$
 $2x - 3y = 12$
and hence find the value of a , if $4x + 3y = a$.
31. Raj, on his birthday, distributed chocolates in an orphanage. He gave 2 chocolates to each child and 20 chocolates to adults. Considering number of children as x and total number of chocolates distributed is y , form the linear equation. If the total number of chocolates distributed is 150, how many children are there in the orphanage. Explain the value depicted by Raj in the question.

