BUDHA DAL PUBLIC SCHOOL PATIALA

FIRST TERM EXAMINATION (20 September 2025)

Class – X

Paper-Mathematics Standard (Set-B)

Time: 3hrs. **M.M. 80**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

Section-A

1. The HCF of smallest prime number and smallest composite number is

   a) 2 b) 4 c) 6 d) 8

2. If one zero of the quadratic polynomial $kx^2 + 3x + k$ is 2 then value of k is

   a) $\frac{5}{6}$ b) $-\frac{5}{6}$ c) $\frac{6}{5}$ d) $-\frac{6}{5}$

3. The LCM of $2^3 \times 3^2$ *and* $2^2 \times 3^3$ is

   a) 2^3 b) 600 c) 720 d) 800

4. A quadratic polynomial the sum of whose zeroes is -5 and product is 6 is

   a) $x^2 + 5x + 6$ b) $x^2 - 5x + 6$ c) $x^2 - 5x - 6$ d) $-x^2 + 5x + 6$

5. If a pair of linear equations is consistent then their graph lines will be

   a) parallel b) always coincident c)always intersecting d) intersecting or coincident

6. If the discriminant of the quadratic equation $3x^2 - 2x + c = 0$ is 16 then the value of c is

   a) 1 b) 0 c) -1 d) $\sqrt{2}$

7. A quadratic equation whose roots are $2 + \sqrt{3}$ *and* $2 - \sqrt{3}$ is

   a) $x^2 - 4x + 1 = 0$ b) $x^2 + 4x + 1 = 1$ c) $4x^2 - 3 = 0$ d) $x^2 - 1 = 0$

8. The system of equations $x = 0, y = 3$ has

   a) unique solution b) no solution c) infinitely many solutions d) none of these

9. The next term of the A.P. $\sqrt{18}$, $\sqrt{50}$, $\sqrt{98}$…. is

   a) $\sqrt{146}$ b) $\sqrt{128}$ c) $\sqrt{162}$ d) $\sqrt{200}$

10. The 12^{th} term of an A.P. whose first two terms are -3 *and* 4 is

a) 67 b) 74 c) 60 d) 81

11. In $\Delta ABC \sim \Delta PQR$ with $\angle A = 32^0$ *and* $\angle R = 65^0$, then measure of $\angle B$ is

a) 32^0 b) 65^0 c) 83^0 d) 97^0

12. In ΔABC *and* ΔDEF; $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar when

a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$

13. If $x \tan 45^0 \cos 60^0 = \sin 60^0 \cot 60^0$ then x is

a) 1 b) $\sqrt{3}$ c) $\frac{1}{2}$ d) $\frac{1}{\sqrt{2}}$

14. If mean and median of a data is 12 and 15 respectively then its mode is

a) 13.5 b) 21 c) 6 d) 14

15. Find modal class of this distribution

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	3	9	15	30	18	5

(a) 20-30 (b) 30-40 (c) 40-50 (d) 10-20

16. The LCM of two numbers is 1200. Which of the following cannot be their HCF?

a) 600 b) 500 c) 400 d) 200

17. If the pair of equations $3x - y + 8 = 0$ *and* $6x - ay + 16 = 0$ represent coincident lines then value of a is

a) $-\frac{1}{2}$ b) $\frac{1}{2}$ c) 2 d) -2

18. If $2\sin^2 \alpha - \cos^2 \alpha = 2$, then α is equal to

a) 0^0 b) 90^0 c) 45^0 d) 30^0

19. Statement A (Assertion) : If $\sin A = \frac{1}{3} (0^0 < A < 90^0)$ then value of $\cos A$ is $\frac{2\sqrt{2}}{3}$

Statement R (Reason) : For every angle θ, $sin^2\theta + cos^2\theta = 1$

a) Both A and R are true and Reason (R) is correct explanation of A

b) Both A and R are true but Reason (R) is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

20. Statement A (Assertion) : If the sum of zeroes of the quadratic polynomial $f(x) = 3x^2 + kx + 5$ is $-\frac{2}{3}$ then value of k *is* 2.

Statement R (Reason) : The product of zeroes of polynomial $ax^2 + bx + c$ is $\frac{c}{a}$

a) Both A and R are true and Reason (R) is correct explanation of A

b) Both A and R are true but Reason (R) is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

Section - B

21. Given that $\sqrt{3}$ is an irrational number. Prove that $\frac{2+\sqrt{3}}{5}$ is an irrational number.

OR

Prove that $\sqrt{2}$ is an irrational number.

22. If α *and* β are the zero of the quadratic polynomial $f(x) = 3x^2 - 4x + 1$, then find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$

23. For what value of k will be following system of equations has infinitely many solutions?

$$2x + 3y = 4$$
$$(k + 2)\,x + 6y = (3k + 2)$$

24. Find k for which the given equation has real and equal roots $9x^2 + 3kx + 4 = 0$

25. Which term of the arithmetic progression 5, 15, 25, ... Will be 130 more than its 31st term?

Section - C

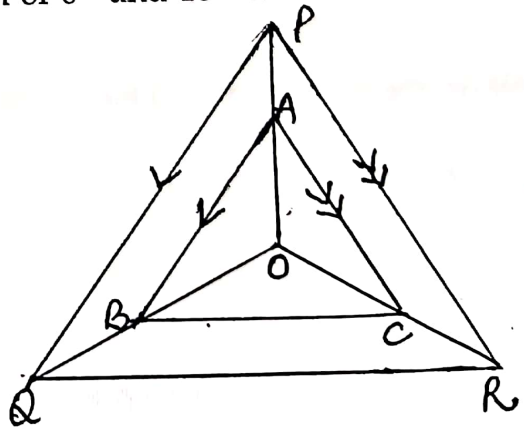
26. If $\tan A = \sqrt{2} + 1$, find $\frac{\tan A}{1+\tan^2 A}$

27. 4 chairs and 3 tables cost Rs. 2100 and 5 chairs and 2 tables cost Rs. 1750. Find cost of a chair and table separately.

28. Find the zeroes of $6x^2 - 7x - 3$ and verify the relationship between the zeroes and coefficients.

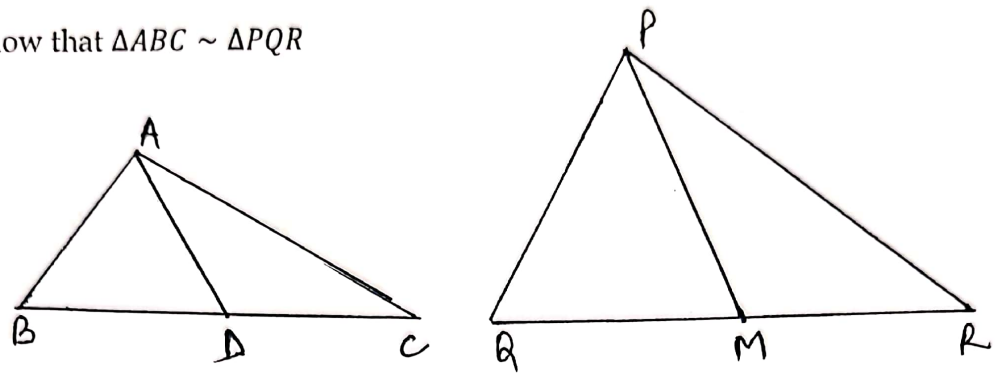
29. The sum of 4th and 8th term of an AP is 24 and sum of 6th and 10th term is 44. Find first three terms of an AP?

30. In the given figure A, B and C are the points of OP, OQ and OR respectively such that $AB \parallel PQ$ *and* $AC \parallel PR$, show that $BC \parallel QR$



OR

Sides AB, BC and AD of a ΔABC are respectively proportional to sides PQ, QR and median PM of ΔPQR. Show that $\Delta ABC \sim \Delta PQR$



31. The following table gives the literacy vote (in percentage) of 35 cities. Find mean literacy rate (using Step Deviation Method)

Literacy rate (in %)	45-55	55-65	65-75	75-85	85-95
Number of cities	3	10	11	8	3

Section – D

32. The sum of a two digit number and the number obtained by reversing the order of its digits is 165. If the digits of the number differ by 3, find the number. How many such numbers are there?

OR

Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

33. A train travels a distance of 300 km at a constant speed. If the speed of the train is increased by 5km/hr, the journey would have taken 2 hours less. Find the original speed of the train.

34. Prove the identity $(cosec\ \theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

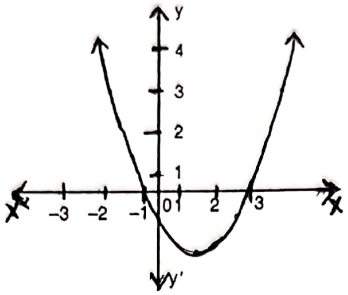
35. The median of the following data is 50. Find the values of x and y, if the total frequency is 90

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	x	15	25	20	y	8	10

Section – E

Case Study :

36. Due to heavy storm an electric wire got bent as shown in the following figure. It followed a mathematical shape. Answer the following questions:



Based on the above information, answer the following questions:

1. Name the shape in which the wire is bent
2. How many zeroes are there for the polynomial representing the shape of the wire?
3. Write the expression of the polynomial representing the wire.

37. Treasure Hunt is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize.

While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number of the n^{th} spot is $20 + 4n$, then answer the following questions to help the players in spotting the clues:

Based on the above information, answer the following questions:

1. Which number is on first spot?
2. Which part is numbered as 112 ?
3. What is the sum of all the numbers on the first 10 spots?

38. A tower stands vertically on ground. The height of tower is 20m and length of its shadow is 15m.

Based on the above information, answer the following questions:

1. Find the length of AC
2. Find the value of $\sec A$
3. Find the value of $sin^2C + cos^2C$

OR

Find the value of $sec^2A - tan^2A$