BLUE PRINT : SA-I (X) : MATHEMATICS

Unit/Topic	MCQ (1 mark)	Short answer (2 marks)	Short answer (2 marks)	Long answer (2 marks)	Total
Number System Real numbers	1(1)	4(2)	6(2)	--	**11(5)**
Algebra Polynomials, Pair of Linear Equations in two variables	1(1)	--	6(2)	16(4)	**23(7)**
Geometry Triangles	1(1)	2(1)	6(2)	8(2)	**17(6)**
Trigonometry	--	4(2)	6(2)	12(3)	**22(7)**
Statistics	1(1)	2(1)	6(2)	8(2)	**17(6)**
Total	4(4)	12(6)	30(10)	44(11)	**90(31)**

SAMPLE PAPER – III

Class – X **Max. Marks: 90**
Subject: Mathematics **Time Allowed: 3 hrs**

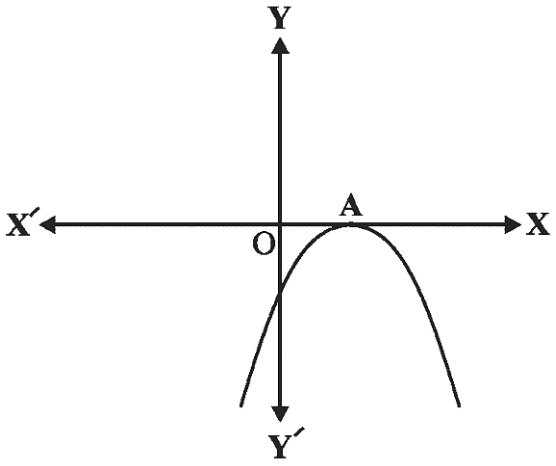
General Instruction:

(i) All questions are compulsory.
(ii) The question paper consists of 31 questions divided into four sections A, B. C and D.
(iii) Section A contains 4 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 11 questions of 4 marks each.
(iv) Use of calculator is not permitted.

SECTION – A

1. Euclid's division lemma state that for any positive integers a and b, there exist unique integers q and r such that a = bq + r where r must satisfy
(a) $1 < r < b$ (b) $0 < r \le b$ (c) $0 \le r < b$ (d) $0 < r < b$

2. Find the number of zeroes of the polynomial from the graph.



3. A girl walks 200 towards East and the she walks 150m towards North. Find the distance of the girl from the starting point.

4. If mode of a statistical data is 100 and mean is 120 then find the median of data.

SECTION – B

5. Given that HCF (306, 657) = 9, find the LCM(306, 657).

6. If $\cot\theta = \frac{15}{8}$, evaluate $\frac{(2+2\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(2-2\cos\theta)}$.

7. $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2. If EF = 15.4 cm, find the value of BC

8. Show that 6^n cannot end with the digit 0 or 5 for any natural number *n*.

9. The following is the distribution of weights (in kg) of 40 persons:

Weight(in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
No. of persons	4	4	13	5	6	5	2	1

Construct a cumulative frequency distribution (of less than type) table for the data above.

10. If $\cos\alpha = \frac{1}{2}$ and $\tan\beta = \frac{1}{\sqrt{3}}$. Find $\sin(\alpha+\beta)$ where α and β are both acute angles.

SECTION – C

11. Prove that $5-\sqrt{2}$ is an irrational number.

12. If α, β are the zeroes of the polynomials f(x) = x^2 – 3x + 6, then find the value of

$\frac{1}{\alpha}+\frac{1}{\beta}+\alpha^2+\beta^2-2\alpha\beta$

13. Find the quotient and remainder when $4x^3 + 2x^2 + 5x - 6$ is divided by $2x^2 + 3x + 1$.

14. A two-digit number is 4 more than 6 times the sum of its digit. If 18 is subtracted from the number, the digits are reversed. Find the number.

15. Prove that $\frac{\sin A}{\cot A+\operatorname{cosec} A} = 2+\frac{\sin A}{\cot A-\operatorname{cosec} A}$.

16. If $\cos\theta+\sin\theta=\sqrt{2}\cos\theta$, prove that $\cos\theta-\sin\theta=\sqrt{2}\sin\theta$

17. Diagonals of a trapezium PQRS intersect each other at the point O, PQ || RS and PQ = 3 RS. Find the ratio of the areas of triangles POQ and ROS.

18. Find the average height of maximum number of students from the following distribution:

Height(in cm)	160-162	163-165	166-168	169-171	172-174
No. of students	15	118	142	127	18

19. Find the median wages for the following frequency distribution:

Wages per day	61-70	71-80	81-90	91-100	101-110	111-120
No. of workers	5	15	20	30	10	8

20. If AD and PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $\frac{AB}{PQ}=\frac{AD}{PM}$

SECTION – D

21. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

22. Find all the zeroes of the polynomial $2x^4+7x^3-19x^2-14x+30$, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

23. Solve for x and y: $\frac{1}{2(2x+3y)}+\frac{12}{7(3x-2y)}=\frac{1}{2}$; $\frac{7}{(2x+3y)}+\frac{4}{(3x-2y)}=2$.

24. If $\operatorname{cosec}\theta-\sin\theta=a^3$ and $\sec\theta-\cos\theta=b^3$, prove that $a^2b^2(a^2+b^2)=1$

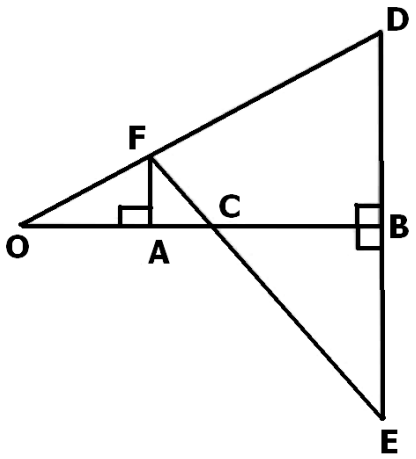
25. If $\sec\theta$ = x + $\frac{1}{4x}$, Prove that $\sec\theta$ + tan θ = 2x or $\frac{1}{2x}$.

26. If the median of the distribution given below is 28.5, find the values of *x* and *y*.

C. I.	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
F	5	x	20	15	y	5	100

27. Solve the following system of linear equations graphically: $2x-5y+4=0$; $2x+y-8=0$. Find the points where these lines meet the y-axis and shade the triangular region formed by these lines and x – axis.

28. In the below Figure, OB is the perpendicular bisector of the line segment DE, FA ⊥OB and FE intersects OB at the point C. Prove that $\frac{1}{OA}+\frac{1}{OB}=\frac{2}{OC}$



29. For the following distribution, draw the cumulative frequency curve more than type and hence obtain the median from the graph.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of Students	6	15	29	41	60	70

30. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars? Which speed you prefer while driving in a city and why?

31. Evaluate without using tables: $\frac{\sec\theta\cos ec(90^0-\theta)-\tan\theta\cot(90^0-\theta)+(\sin^2 35^0+\sin^2 55^0)}{\tan 10^0\tan 20^0\tan 60^0\tan 70^0\tan 80^0}$