Marks obtained	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
No. of Students	10	?	25	30	?	10	100

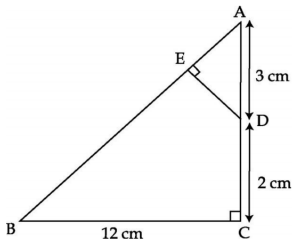
Section D

25. Draw the graph of 2x + y = 6 and 2x – y + 2 = 0. Shade the region bounded by these lines with x axis. Find the area of the shaded region.

26. The sum of a 2 digit number and number obtained by reversing the order of digits is 99. If the digits of the number differ by 3, find the number.

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

28. In the given figure, ΔABC is right angled at C and DE⊥AB. Prove that ∠ABC ~ ∠ADE and find the lengths of AE and DE.



29. Prove that: $\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1} = \frac{1 + \cos A}{\sin A}$.

30. Prove that: $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = 2 \operatorname{cosec} \theta$.

31. Evaluate: $\frac{\sec^2(90^\circ - \theta) - \cot^2\theta}{2(\sin^2 25^\circ + \sin^2 65^\circ)} + \frac{2(\sin^2 30^\circ \tan^2 32^\circ \tan^2 58^\circ}{3(\sec^2 33^\circ - \cot^2 57^\circ)}$.

32. Use Euclid's division lemma to show that cube of any positive integer is either of form 9q, 9q + 1 or 9q + 8 for some integer q.

33. The following table shows the ages of 100 persons of a locality. Draw a less than type ogive for this data.

Age (years)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of persons	5	15	20	23	17	11	9

34. Draw less than and more than ogive for the following distribution and hence obtain the median.

Marks	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
No. of students	14	6	10	20	30	8	12

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Mathematics

SA – 1 (Sep, 2013) **Mega Test – 1** **Class X**

Time allowed: 3 hours **Maximum Marks: 90**

General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of 34 questions divided into four sections A, B, C and D. Section - A comprises of 8 questions of 1 mark each, section - B comprises of 6 questions of 2 marks each, section - C comprises of 10 questions of 3 marks each and section - D comprises 10 questions of 4 marks each.

(iii) Question numbers 1 to 8 in section - A are multiple choice questions where you are to select one correct option out of the given four.

(iv) There is no overall choice. ~~However, internal choice have 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.~~

(v) Use of calculator is not permitted.

Section	A	B	C	D
Q. No.	1 - 8	9 - 14	15 - 24	25 - 34
Marks	1	2	3	4

Section A

Question numbers 1 to 8 carry one mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

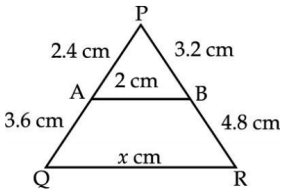
1. The [HCF × LCM] for the numbers 50 and 20 is:
(a) 10 (b) 100 (c) 1000 (d) 50

2. If $(x + 1)$ is a factor of $x^2 - 3ax + 3a - 7$, then the value of a is:
(a) 1 (b) -1 (c) 0 (d) -2

3. The pair of linear equations x -2y = 5 and 2x - 4y = 10 has:
(A) Infinitely many solutions (B) No solution
(C) One solution (D) Two solutions

4. The value of k for which the pair of linear equations 4x + 6y – 1 = 0 and 2x + ky – 7 = 0 represents parallel lines is:
(a) k = 3 (b) k = 2 (c) k = 4 (d) k = - 2

5. In the given figure, value of x (in cm) is:
(A) 4 (B) 5 (C) 6 (D) 8



6. If $\sin 3\theta = \cos(\theta - 26°)$ where 3θ and $(\theta - 26°)$ are acute angles, then value of θ is:
(A) 30° (B) 29° (C) 27° (D) 26°

7. If $\sec\theta = 2x$ and $y \tan\theta = 2$, then the value of $2\left(x^2 - \frac{1}{y^2}\right)$ is:

(A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{4}$

8. The upper limit of the median class of the following distribution is:

Class	0 – 5	6 – 11	12 – 17	18 – 23	24 – 29
Frequency	13	10	15	8	11

(a) 17 (b) 17.5 (c) 18 (d) 18.5

Section B

9. Find the mode of the following data:

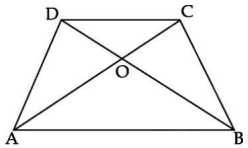
Class	0 – 12	20 – 40	40 – 60	60 – 80
Frequency	15	6	18	10

10. If α and β are the zeroes of $x^2 + 7x + 12$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$.

11. It being given that 1 is one of the zeros of the polynomial $7x - x^3 - 6$. Find its other zeroes.

12. Solve the following system of linear equations by substitution method:
$2x - y = 2$; $x + 3y = 15$

13. In the given figure, ABCD is a trapezium in which AB ||DC. The diagonals AC and DB intersect at O. Prove that: $\frac{OA}{OC} = \frac{OB}{OD}$



14. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0° < A + B \le 90°$; $A > B$, find A and B.

Section C

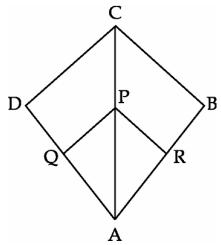
15. Prove that $\sqrt{7}$ is an irrational number.

16. Use Euclid's division algorithm to find the HCF of 10224 and 9648.

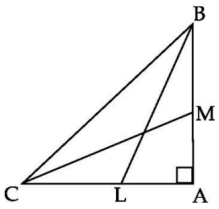
17. If α and β are the zeroes of the polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k.

18. The age of a father is equal to sum of the ages of his 6 children. After 15 years, twice the age of the father will be the sum of ages of his children. Find the age of the father.

19. In the figure below, PQ||CD and PR||CB. Prove that $\frac{AQ}{QD} = \frac{AR}{RB}$.



20. In figure, BL and CM are medians of ΔABC right angled at A. Prove that:
$4(BL^2 + CM^2) = 5BC^2$



21. Prove that $(\text{cosec } A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$.

22. If A, B, C are interior angles of ΔABC, show that: $\text{cosec}^2\left(\frac{B+C}{2}\right) - \tan^2\frac{A}{2} = 1$.

23. The mean of the following frequency distribution is 50. Find the value of p.

Classes	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Frequency	17	28	32	p	19

24. Find the missing frequencies in the following frequency distribution table, if N = 100 and median is 32.