

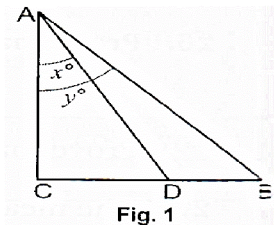


Class – X
Subject – Mathematics

Time: 3 hours
Maximum marks: 90

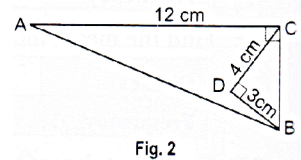
Section – A (1 mark each.)

- In Fig. 1, if D is mid-point of BC, the value of $\tan x / \tan y$ is
 - 1/3
 - 1
 - 2
 - $\frac{1}{2}$

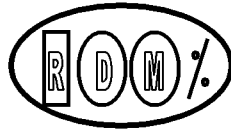


- If $x = 3\sec^2 \theta - 1, y = \tan^2 \theta - 2$, then $x - 3y$ is equal to
 - 3
 - 4
 - 8
 - 5

- In Fig. 2, angle $ACB = 90^\circ$, angle $BDC = 90^\circ$, $CD = 4$ cm, $BD = 3$ cm, $AC = 12$ cm. $\cos A - \sin A$ is equal to
 - 5/12
 - 5/13
 - 7/12
 - 7/13



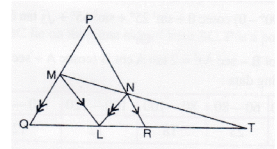
- For a given data with 50 observations the 'less than Ogive' and the 'more than Ogive' intersect at (15.5, 20). The median of the data is
 - 4.5
 - 20
 - 50
 - 15.5
- The perimeters of two similar ΔABC and ΔLMN are 60 cm and 48 cm respectively. If $LM = 8$ cm, length of AB is
 - 10 cm
 - 8 cm
 - 5 cm
 - 6 cm
- If α, β are zeroes of polynomial $f(x) = x^2 + px + q$ then polynomial having $1/\alpha$ and $1/\beta$ as its zeroes is:
 - $x^2 + qx + p$
 - $x^2 - px + q$
 - $qx^2 + px + 1$
 - $px^2 + qx + 1$
- If a, b are co-prime, then a^2, b^2 are
 - Co-prime
 - Not co-prime
 - odd numbers
 - both equal
- $n^2 - 1$ is divisible by 8, if n is
 - an integer
 - an odd integer
 - a natural number
 - an even integer



Section - B (2 marks each.)

9. Find the greatest number which when divided by 2053 and 967 leaves remainders 5 and 7 respectively.

10. L is point on side QR of a triangle PQR. If $LM \parallel PR$ and $LN \parallel PQ$ and a line MN meets the produced line QR in T as given in figure. Prove that $LT^2 = RT \times TQ$.



11. If $\sin (2A + 45^\circ) = \cos (30^\circ - A)$ and $0^\circ < A < 90^\circ$. Find the value of A.
12. The following data gives the information on the observed life span (in hours) of 225 electrical components :

Life span (m hour")	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	10	35	52	61	38	29

Find the modal life span of the components.

13. Explain why $7 \times 11 \times 13 + 11$ is a composite number?
14. If $\sin 3\theta = \cos (\theta - 6^\circ)$ and 3θ and $\theta - 6^\circ$ are acute angles, find the value of θ .

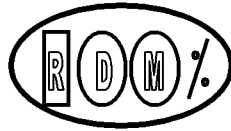
Or

If $\sin A = \cos B$, can you say A and B are complementary?

Section - C (3 MARKS)

15. If A, B, C are interior angles of ΔABC , show that $\sec^2 \left(\frac{B+C}{2} \right) - 1 = \cot^2 \frac{A}{2}$
16. If $\sin \theta = m / n$, find the value of $\frac{\tan \theta + 4}{4 \cot \theta + 1}$
17. If $2\cos\theta - \sin \theta = x$ and $\cos \theta - 3 \sin \theta = y$. Prove that $2x^2 + y^2 - 2xy = 5$.
18. Find the mode of the following frequency distribution:

Class interval	5-15	15-25	25-35	35-45	45-55	55-65	65-75
Frequency	2	3	5	7	4	2	2



19. The mean of the following frequency distribution is 25.2. Find the missing frequency x.

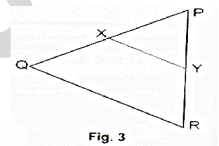
Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	8	X	10	11	9

OR

The median of the distribution given below is 35. Find the value of x and y, if the sum all frequencies is 170.

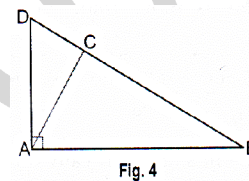
Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	10	20	X	40	Y	25	15

20. In Fig. 3, $XY \parallel QR$, $PQ / XQ = 7/3$ and $PR = 6.3$ cm. Find YR.



21. In Fig. 4, ABD is a triangle in which $\angle DAB = 90^\circ$ and $AC \perp BD$. Prove that $AC^2 = BC \times DC$.

22. Show that $5 + \sqrt{2}$ is an irrational number.



OR

Prove that $\sqrt{3} + \sqrt{5}$ is irrational.

23. If 4 times the area of a smaller square is subtracted from the area of a large square, the result is 144 m^2 . The sum of the areas of the two squares is 464 m^2 . Determine the sides of the two squares.

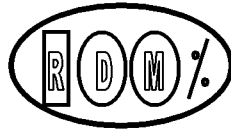
OR Solve for x and y; $x/a + y/b = 2$ and $ax - by = a^2 - b^2$.

24. On dividing $x^3 - 3x^2 + X + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.

Section - D (4 MARKS)

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

26. Prove that: $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2 \operatorname{cosec} A$



27. In a ΔABC , angle $C = 3$ angle $B = 2$ (angle $A +$ angle B). Find the three angles.
Or

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

28. The heights (in cm) of 60 persons of different age groups are shown in the following table:

Height (in cm)	145 - 150	150 - 155	155 - 160	160-165	165 - 170	170-175
No. of persons	8	10	9	15	10	8

Using the above table, draw (i) less than ogive (ii) more than ogive.

Or

The following table gives the daily income of 50 workers of a factory:

Daily income (in Rs)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

Find the Mean, Mode and Median of the above data.

29. If $x + a$ is a factor of the polynomial $x^2 + px + q$ and $x^2 + mx + n$, prove that $a = \frac{n - q}{m - p}$

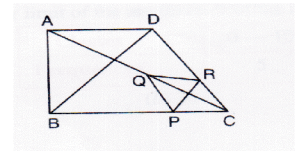
30. Show that $\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1} = \frac{1 + \cos A}{\sin A}$

31. Solve the following system of equations for x and y :

$$\frac{5}{x-1} + \frac{1}{y-2} = 2; \quad \frac{6}{x-1} - \frac{3}{y-2} = 1$$

32. Places A and B are 100 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction, they meet in 10 hours and if they move in opposite direction, they meet in 1 hour and 40 minutes. Find the speed of the cars.

33. In figure, two triangles ABC and DBC lie on the same side of base BC . P is a point on BC such that $PQ \parallel BA$ and $PR \parallel BD$. Prove that $QR \parallel AD$.



34. The median of the following data is 525.

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

Find the values of x and y if the total frequency is 100.