I. Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the correct alternative and write the complete answer along with its letter of alphabet.

$$8 \times 1 = 8$$

1. In the pair of linear equations $x + y = 9$ and $x - y = 1$, the value of x and y are

   (A) 5 and 4   (B) 4 and 5   (C) 6 and 3   (D) 3 and 6

2. The nth term of an Arithmetic Progression is $a_n = 4n + 5$. Then its 5th term is

   (A) 20   (B) 14   (C) 25   (D) 24

3. The roots of the equation $(x - 3)(x + 2) = 0$ are

   (A) – 3, 2   (B) 3, – 2   (C) – 3, – 2   (D) 3, 2

4. $1 + \tan^2\theta$ is equal to

   (A) $\mathrm{cosec}^2\theta$ (B) $\dfrac{1}{cosec^2\theta}$ (C) $\sec^2\theta$ (D) $-\sec^2\theta$

5. In the given figure AT is a tangent drawn at the point A to the circle with centre O such that OT = 4 cm. If $\angle OTA = 30°$ then AT is

   (A) 4 cm   (B) 2 cm   (C) $2\sqrt{3}$ cm   (D) $4\sqrt{3}$ cm
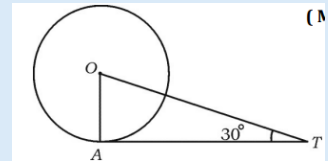
6. If the area of a circle is 49π sq units, then its perimeter is

   (A) 7π units   (B) 9π units   (C) 14π units   (D) 49π units

7. The product of prime factors of 120 is

   (A) $23 \times 32 \times 51$ (B) $22 \times 31 \times 51$ (C) $23 \times 31 \times 52$ (D) $23 \times 31 \times 51$

8. The probability of an event ' E ' is 0.05 , then the probability of an event ' Not E ' is

   (A) 0.05   (B) 0.95   (C) $\dfrac{1}{0.05}$ (D) $\dfrac{1}{0.95}$

II. Answer the following: $8 \times 1 = 8$

9. The given graph represents a pair of two variables. Write how many solutions the se pair of equations have.
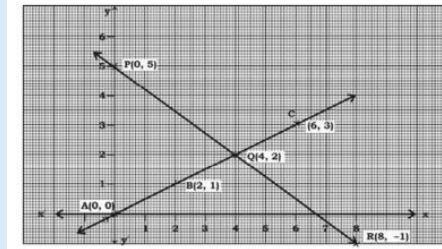
10. The LCM of 24 and 36 is 48 and hence, find their HCF

11. Write the degree of the polynomial $f(x) = 2x^2 - 3x^3 + 2$

12. A point 'P' divides the line joining of points A (x_1, y_1) and B (x_2, y_2) in the ratio $m_1 : m_2$ internally then write the co-ordinates of P

13. Find the value of the discriminant of the quadratic equation $2y^2 - 8y - 10 = 0$.

14. Find Sec A, if 15 cot A = 8.

15. State Thales theorem.

16. Write the formula to find the volume (V) of the frustum of a cone of height h and radii of two circular ends r_1 and r_2

III. Answer the following questions. $8 \times 2 = 16$

17. Find the sum of the first 22 terms of an AP in which $d = 7$ and 22nd term is 149.

18. Solve the pair of linear equations by any suitable method.

   $x + 2y = 8$ and $2x + y = 7$

19. In a circle of radius 5cm draw two tangents at the end of radii such that angle between the radii is 100^0.

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

21. If the product of the zeros of the quadratic polynomials $p(x) = (k - 2) x^2 - 4x + k$, is 3, find the value of k.

22. Solve by Quadratic formula. $x^2 - 3x - 10 = 0$

23. If $\sin \theta = 1/2$, show that $(3\cos \theta - 4 \cos^3 \theta) = 0$.

<div align="center">**OR**</div>

If $3 \tan \theta = 4$, evaluate $(3\sin \theta + 2 \cos \theta) / (3\sin \theta - 2\cos \theta)$.

24. A die is thrown twice, what is the probability that

(i) 5 will not come up either time(ii) 5 will come up at least once?

IV. Answer the following questions.   **9×3=27**

25. Prove that "the lengths of tangents drawn from an external point to a circle are equal".

26. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

<div align="center">**OR**</div>

The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7 : 15. Find the numbers.

27. If the points (2,3) (4, k) and (6, -3) are collinear find the value of k.

<div align="center">**OR**</div>

Find the coordinates of the points of trisection of the line joining the points

(-3,0) and (6,6).

28. In $\triangle$ ABC, DE || BC. If 3DE = 2BC and the area of $\triangle$ ABC is **81 cm^2**, show that the area of $\triangle$ ADE is **36 cm^2**
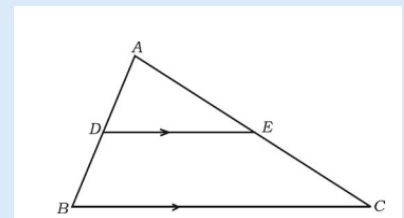
29. Prove that $\dfrac{Cot\,A + Cosec\,A - 1}{Cot\,A - Cosec\,A + 1} = \dfrac{1 + Cos\,A}{Sin\,A}$

30. Calculate the median for the following:

C.I	0-10	10-20	20-30	30-40	40-50
Frequency	3	5	9	5	3

<div align="center">**OR**</div>

Find the mode for the following grouped data:

Class-interval	Frequency
5 — 15	3
15 — 25	4
25 — 35	8
35 — 45	7
45 — 55	3

31. The following distribution gives the daily income of 50 workers of a factory.

| Daily income (in Rs)	Number of workers
100-150	15
150-200	12
200-250	10
250-300	8
300-350	5

Convert the above distribution to a 'less than type' cumulative frequency distribution, and draw its Ogive.

32. A cubical ice-cream brick of edge 22 cm is to be distributed among some children by filling ice-cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice cream cones?

OR

A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs. 500 per m^2. (Note that the base of the tent will not be covered with canvas.)

33. The area of an equilateral triangle ABC is 17320.5 cm². With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle (see figure). Find the area of the shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)
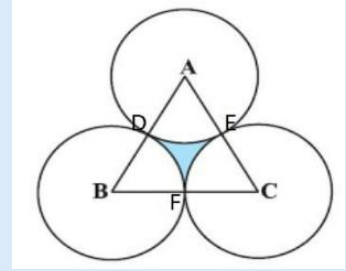
## V. Answer the following questions.   4×4=16

34. Find the solution of the following pairs of linear equation by the graphical method

$2x + y = 6$ $2x - y = 2$

35. Draw a right triangle in which the sides (other than hypotenuse) are of length 8 cm and 6 cm, then construct another triangle whose sides are $\frac{5}{4}$ times the corresponding sides of the given triangle.

36. The angle of elevation of an aircraft from a point on horizontal ground is found to be 30^0. The angle of elevation of same aircraft after 24 seconds which is moving horizontally to the ground is found to be 60^0. If the height of the air craft from the ground is $3600\sqrt{3}$ metre. Find the velocity of the aircraft.
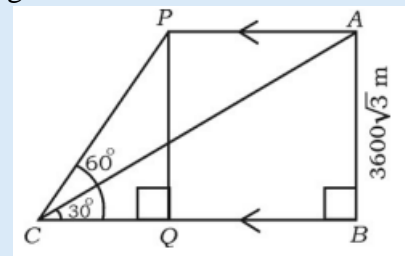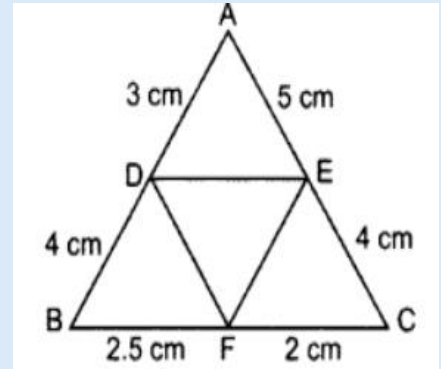

OR

As observed from the top of a 75 m high light house from the sea- level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the light house, then find the distance between the two ships.
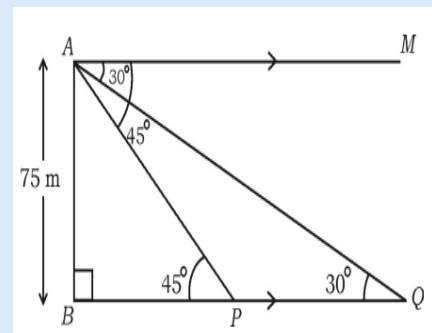
37. In the given figure, AD = 3 cm, AE = 5 cm, BD = 4 cm, CE = 4 cm, CF = 2 cm, BF = 2.5 cm, then find the pair of parallel lines and hence their lengths

VI. Answer the following questions.   **1×5=5**

38. State and prove Pythagoras theorem.

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