

OFFICE OF THE DEPUTY DIRECTOR, DEPARTMENT OF SCHOOL EDUCATION.

MYSORE DIST.

Model paper - 1 - 2023-24

SUBJECT: MATHEMATICS

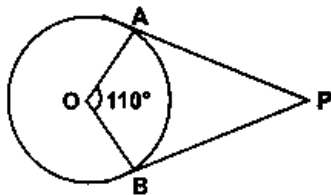
SUBJECT CODE:81E

Time: 3hrs.15minutes

Max.Marks:80

I.The following questions are incomplete statements have four alternatives choose the most appropriate answer and write it along with its alphabet. [8 x 1 = 8]

- If the n^{th} term of an arithmetic progression is $a_n=2-2n$, then its 10^{th} term is
(A) 22 (B) 12 (C) -22 (D) -18
- HCF of 8 and 44 is
(A) 4 (B) 8 (C) 44 (D) 362
- The pair of linear equations $3x + y = 8$ and $ax + by = 5$ represents parallel lines, then the value of 'a' and 'b' are
(A) 2, 1 (B) 3, 1 (C) 5, 2 (D) 1, 3
- The sum and product of zeros of the polynomial $p(x)=2x^2 -6x + 8$ are
(A) 3, 2 (B) 6, -8 (C) 3, 4 (D) -6, 8
- The coordinates of the mid point of the line segment joining the points (0,5) and (0, -5) is
(A) (0,5) (B) (10,0) (C) (0,10) (D) (0,0)
- The ratio of the areas of two similar triangles are 9:64, then the ratio of their corresponding sides is
(A) 3:8 (B) 8:3 (C) 9:64 (D) 64:9
- In the figure ,PA and PB are tangents to the circle with centre O. $\angle AOB = 110^\circ$
The value of $\angle APB$ is



- (A) 100° (B) 55° (C) 70° (D) 80°

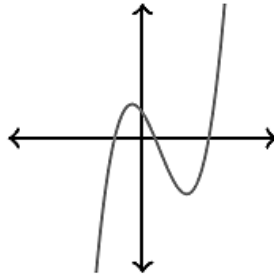
8. The total surface area of the solid Cylinder of radius 'r' and height 'h' is

- (A) $\pi r^2 h$ (B) $2\pi r^2 h$ (C) $2\pi r(r+h)$ (D) $2\pi r h$

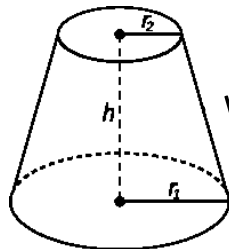
II. Answer the following questions:

[8 x 1 = 8]

9. How many solutions do the pair of linear equations has, if the lines represented by them are intersect?
10. Find the number of zeroes in the graph of the polynomial $y = P(x)$.



11. Write the nature of roots for the quadratic equation having discriminant value 0.
12. write prime factorisation form of 'q' in a rational number $x = \frac{p}{q}$.
13. The probability of an event 'E' is 0.65 , then find the probability of not 'E'.
14. Write the formula to find the volume of a Frustrum .



15. State "Basic propotionality theorem".
16. Write the distance of a coordinate P(x, y) from the origin.

III. Answer the following questions.

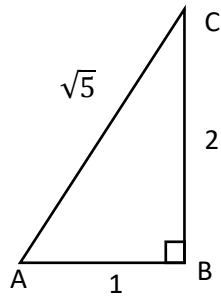
[8x2=16]

17. Solve the given pair of linear equations.
 $x + 2y = 8$
 $x - y = 2$
18. Find the roots of the quadratic equation $2x^2 + 3x - 3=0$, using the 'quadratic formula'.
OR
Find the roots of the quadratic equation $6x + 2 = x^2$ by the method of completing the square.
19. Find the 15th term of the arithmetic progression 3, 8, 13, using formula.

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

21. Draw a circle of radius 3.5 cm., construct a pair of tangents to the circle from a point 9 cm away from its centre

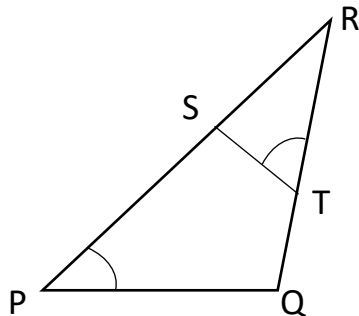
22. In the figure, find $\tan A$ and $\tan(90^\circ - A)$



23. In the ΔABC , D and E are the points on AB and AC respectively. $DE \parallel BC$, $AD=1.5$ cm, $DB= 2.5$ cm and $AE = 5$ cm ,then find EC.

OR

In the given figure, $\angle P = \angle RTS$. Show that $RS.RP = RT.RQ$



24. Group of friends playing with cards bearing numbers 1 to 10. All the cards placed in a box and are mixed thoroughly. What is the probability that the card withdrawn from the box bears a prime number?

III. Answer the following questions.

[9x3=27]

25. Prove that, "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

26. Divide the polynomial $p(x)= 2x^3 - x^2 + 6x -10$ by the polynomial $g(x) =x+2$. Find the quotient $q(x)$ and remainder.

27. Find the 'mean' for the following grouped data

| CI | frequency |
|---------|-----------|
| 0 -10 | 14 |
| 10 – 20 | 12 |
| 20 - 30 | 16 |
| 30 - 40 | 6 |
| 40 – 50 | 2 |

OR

The marks of students of class 10th in mathematics test are given below. Find mode for these marks .

| Marks | Frequency |
|----------|-----------|
| 0 – 20 | 6 |
| 20 - 40 | 12 |
| 40 - 60 | 10 |
| 60 - 80 | 9 |
| 80 - 100 | 7 |

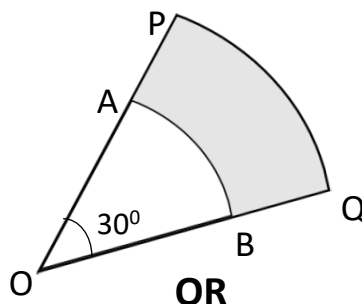
28. Prove that, $\tan^2 A + \cos^2 A - 1 = \tan^2 A \sin^2 A$

OR

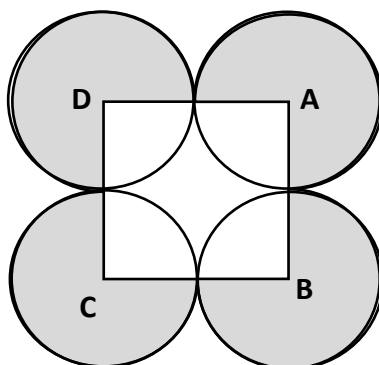
Evaluate:
$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

29. Construct a triangle of sides 5.5 cm , 6 cm and 7 cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of the given triangle.

30. In the figure O is the centre, PQ and AB are respectively the arcs of two concentric circles of a radii 7 cm and 3.5 cm. If $\angle POQ = 30^\circ$, then find the area of the shaded region. [Use $\pi = \frac{22}{7}$].



In figure, ABCD is a square of side 6 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally. Find the area of the shaded region.



31. The weights of 50 students of a class are given below. Draw a 'more than' type ogive for the given data.

| Weight (Kg) | Number of Students |
|--------------------------|--------------------|
| more than or equal to 38 | 50 |
| more than or equal to 40 | 42 |
| more than or equal to 42 | 25 |
| more than or equal to 44 | 15 |
| more than or equal to 46 | 10 |
| more than or equal to 48 | 5 |
| more than or equal to 50 | 3 |

32. Find the area of the triangle whose vertices are (0,6), (0, 0), (8, 0)

33. A shopkeeper buys a certain number of books for Rs.720. If the cost per book was Rs.5 less, the number of books that could be bought be 2 more. Find the cost of each book.

OR

The height of the triangle is 6cm more than its base. If the area of the triangle is 108 cm^2 then find the height and base of the triangle.

V. Answer the following questions.

[4x4=16]

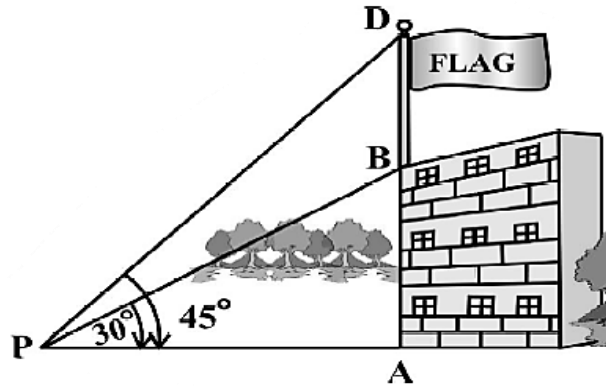
34. Prove that, "If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar".

35. Find the solution of the given pair of linear equations by graphical method.

$$2x + y = 6$$

$$X + y = 5$$

36. From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30° . A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45° . Find the length of the flagstaff and the distance of the building from the point P. (You may take $\sqrt{3} = 1.732$)



37. The 13th term of an Arithmetic Progression is four times its 3rd term. If its fifth term is 16, then find the sum of its first 20 terms.

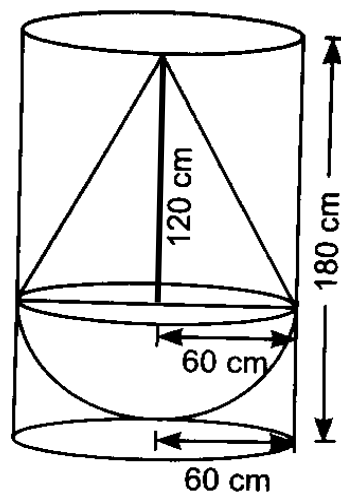
OR

Vijay ask the Labour to dig a well up to a depth of 50 meters. Labour charges Rs.300 for first meter and increases Rs.100 for each subsequent meters. Find the depth of the well when the laborer is paid Rs. 2200? How much labour charges for digging 50 meters?

VI. Answer the following questions.

[5x1=5]

38. A solid consisting of a right circular cone of height 120 cm and radius 60 cm mounted on a hemisphere of radius 60 cm. The solid is completely immersed in a right circular cylinder full of water. How much of water is left in the cylinder. If the inner radius of the cylinder is 60 cm and its height is 180 cm. [$1000 \text{ cm}^3 = 1\text{lt}$]

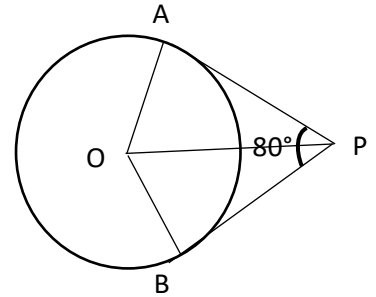


DEPARTMENT OF SCHOOL EDUCATION AND LITERACY

OFFICE OF THE D.D.P.I – MYSORE DISTRICT S.S.L.C. MODEL QUESTION PAPERS – 2024

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the most appropriate one and write it along with its alphabet in your answer booklet. 8 x 1 = 8

1. If the n^{th} term of an A.P is $7 - 4n$ then the common difference is :
(a) 4 (b) -4 (c) 3 (d) -3
2. The lines representing the pair of linear equations $2x+3y-9 = 0$ and $4x +6y -18=0$ are :
(a) Intersecting lines (b) Parallel lines (c) Coinciding lines (d) Perpendicular lines
3. Which of the following is not a quadratic equation ?
(a) $x(x - 1) = 0$ (b) x^2-2x+1 (c) $4x=\frac{72}{x}$ (d) $3x-2 = x^2$
4. 72 and 28 can be expressed using Euclid's division algorithm as :
(a) $28 = (72-16)2$ (b) $72 = (28 \times 2)+16$ (c) $72 = (28 \times 2)-16$ (d) $16 = 72-(28 \times 2)$
5. The formula to find the area of a sector with an angle θ is :
(a) $\frac{\theta}{360^\circ} \times \pi r^2$ (b) $\frac{\theta}{360^\circ} \times 2\pi r$ (c) $\frac{\theta}{360^\circ} \times 2\pi r^2$ (d) $\frac{\theta}{360^\circ} \times \pi r$
6. PA and PB are tangents to a circle from a point P. If $\angle APB = 80^\circ$ then $\angle POA = ?$
(a) 40° (b) 100° (c) 60° (d) 50°
7. If $\sin A = \frac{1}{2}$ then the magnitude of angle A is :
(a) 90° (b) 60° (c) 30° (d) 45°
8. If the probability of winning a game is 0.995 then the probability of losing it is :
(a) 0.005 (b) 0 (c) 1 (d) 0.05



II Answer the following questions :

8 x 1 = 8

9. What is the value of $1 - \cos^2 A$?
10. What is the sum of first 10 natural numbers ?
11. If a pair of linear equations are inconsistent then how many solutions they have?
12. Write the quadratic polynomial with sum of its zeroes 5 and product of zeroes 8.
13. The Volume of a cylinder is 120cm^3 . What is the volume of a cone with the same base and height?
14. State Pythagoras theorem.
15. Name the straight line which is perpendicular to a radius at the non-centered end of a circle.
16. What is the value of $\sin 30^\circ + \cos 60^\circ$?

III Answer the following questions

8 x 2 = 16

17. Construct two tangents to a circle of radius 4cm from a point 9cm away from its center.

18. Solve the pair of linear equations :

$$2x + 3y = 11$$

$$2x - 4y = -24$$

19. Find the sum of first 20 terms of an A.P 5,8,11,. using the formula.

OR

Find the 15th term of the A.P 7 , 12 , 17 using the formula.

20. Find the distance between the points (3 , 1) and (6 , 2) using distance formula.

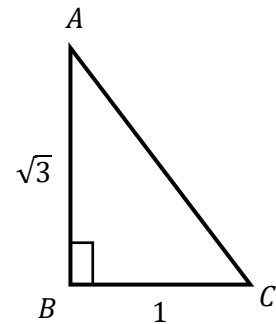
21. Find the roots of the equation $x^2 - 3x - 4 = 0$ using quadratic formula.

OR

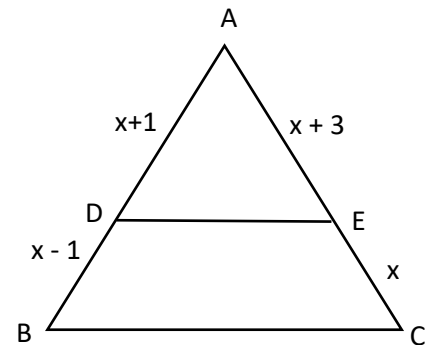
Find the discriminant of the quadratic equation $2x^2 - 6x + 3 = 0$ and hence find the nature of roots.

22. A box contains 6 red 12white and 8 green balls. One ball is taken randomly. Find the probability that it is not a red ball.

23. In the given figure find the value of Cot C and sec A



24. In the given figure in triangle ABC , DE || BC , If AD = x + 1, DB = x - 1 AE = x + 3 and EC = x, find the value of 'x'



IV. Answer the following questions

9 x 3 = 27

25. Prove that the lengths of the tangents drawn from an external point are equal to each other.

26. Construct a triangle with sides 3cm, 4cm and 5cm. Then construct a similar triangle whose sides are $\frac{5}{3}$ of the corresponding sides of the first triangle.

27. Draw a more than type Ogive for the following data :

| | | | | | |
|---------------|---------|---------|---------|---------|---------|
| Daily Income | 100-120 | 120-140 | 140-160 | 160-180 | 180-200 |
| No of workers | 12 | 14 | 8 | 6 | 10 |

28. Find the mean of the following data :

| | | | | | |
|----------------|------|-------|-------|-------|-------|
| Class Interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| frequency | 5 | 8 | 20 | 15 | 7 |

OR

Find the mode of the following data :

| | | | | | |
|----------------|-----|-----|------|-------|-------|
| Class Interval | 1-4 | 4-7 | 7-10 | 10-13 | 13-16 |
| frequency | 7 | 4 | 8 | 6 | 4 |

29. Find the quotient and remainder if $p(x) = x^3 + 5x^2 + 5x + 8$ is divided by $g(x) = x^2 + 3x - 2$

OR

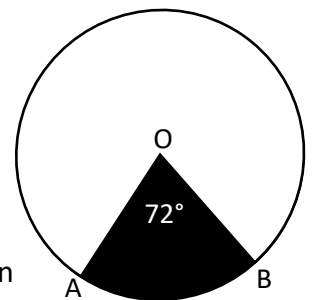
Find the zeroes of the polynomial $p(x) = x^2 + 2x - 15$ and hence verify the relationship between the zeroes and co-efficients.

30. The altitude of a right triangle is 7cm less than its base. If the hypotenuse is 13cm, Find the other two sides of the triangle.

OR

A train travelling with uniform speed for a journey of 360km would have taken 48minutes less to travel the same distance if its speed was 5km/hr. more than before. Find the Original speed of the train.

31. In the given figure the length of the arc AB is 8.8 cm if it subtends an angle of 72° at the center find the area of the shaded region.



32. If the points $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ the vertices of a parallelogram taken in order find the value of 'x' and 'y'. Also find the co-ordinates of the point of intersection of the diagonals of ABCD

OR

Find the area of the triangle whose vertices are $(2, 3)$, $(-1, 0)$ and $(2, -4)$

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

V. Answer the following questions

4 x 4 = 16

34. Prove that if in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar.

35. Solve the following pair of linear equations by graphical method :

$$x + y = 7$$

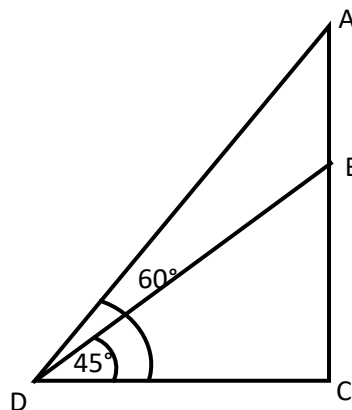
$$3x - y = 1$$

36. A line segment is divided into 4 parts such that they are in A.P. If the sum of the 3rd and 4th parts is 6 times the sum of the first two parts, find the total length of the line segment.

OR

In an A.P the sum of first 11 terms is 44 and that of the next 11 terms is 55. Find the A.P

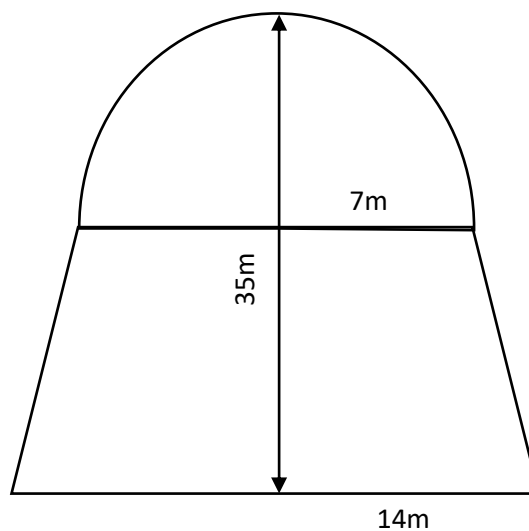
37. The angle of elevation of the top of a building under construction is 45° from a point which is 100m away from its base. Find the height of the building to be raised such that the angle of elevation is 60° when viewed from the same point.



VI. Answer the following question :

5 x 1 = 5

38. A water tank is in the shape of a hemisphere mounted on the frustum of a cone as shown in the figure. The total height of the tank is 35m. The radius of the top and bottom of the tank are 7m and 14m respectively. Find the total surface area of this tank. If the water in this tank is emptied into a cuboidal tank with length 50m and breadth 25m What should be the height of the tank?



Time : 3 hours 15 minutes

Subject Code : 81E

Max. Marks : 80

:General Instructions to the Candidate :

1. This question paper consists of objective and subjective types of 38 questions.
2. Follow the instructions given against both the objective and subjective types of questions.
3. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

I. Four alternatives are given for each of the following questions/ incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

8x1=8

1. The H.C.F. of 31 and 61 is

- A) 1 B) 61 C) 31 D) 92

2. In a class, 'The number of boys (x) are 8 more than girls(y)'. The equation for the statement is

- A) $x = 8y$ B) $x - y = 8$ C) $y - x = 8$ D) $x + y = 8$

3. The first and last term of an arithmetic progression is 5 and 45 then the sum of its first 25 term is

- A) 525 B) 625 C) -625 D) -525

4. The degree of the polynomial $p(x) = x^2 - 3x^3 + 2$ is

- A) 1 B) 2 C) 3 D) 0

5. The formula to find Volume of a frustum of cone is

A) $V = \frac{1}{3}\pi h(r_1^2 + r_2^2)$ cubic unit B) $V = \frac{1}{3}\pi h(r_1^2 - r_2^2)$ cubic unit

C) $V = \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1r_2)$ cubic unit D) $V = 3\pi h(r_1^2 + r_2^2 + r_1r_2)$ cubic unit

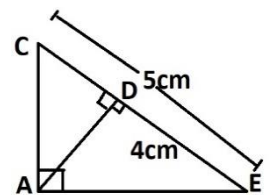
6. The Discriminant of the quadratic equation $2x^2 - 5x + 2 = 0$ is

- A) 3 B) -6 C) 9 D) -9

7. In $\triangle ABC$, $\angle BAC = 90^\circ$ and AD is the altitude,

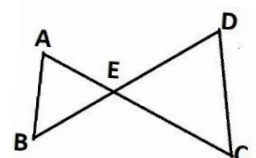
If $BC = 5\text{cm}$, $BD = 4\text{cm}$ then the length of AB is

- A) $3\sqrt{2}\text{cm}$ B) $2\sqrt{5}\text{cm}$ C) $5\sqrt{2}\text{cm}$ D) $2\sqrt{3}\text{cm}$



8. In the adjoining figure, $\triangle ABE \sim \triangle CDE$, $\angle B = \angle D$ then $\frac{AE}{CE}$ is

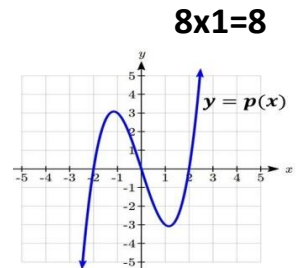
- A) $\frac{AB}{BE}$ B) $\frac{BE}{CE}$ C) $\frac{BE}{DE}$ D) $\frac{AE}{DE}$



II. Answer the following questions

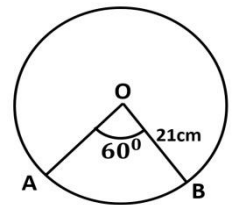
9. Express denominator of $\frac{35}{50}$ in the form of $2^n \times 5^m$

10. In the given graph, find the number of zeros of polynomial $y = p(x)$.



11. If $\tan \theta = \frac{6}{13}$ then what is the value of $\cot \theta$.

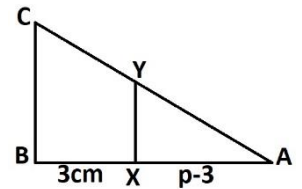
12. In the given figure, the radius of sector is 21cm and angle is 60° find the length of sector arch AB



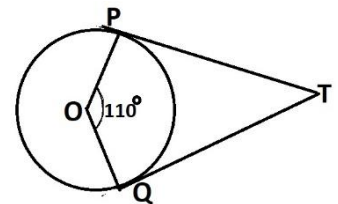
13. A solid cylinder of radius 14 cm and height 21cm then find its lateral surface area of a solid cylinder.

14. The probability that it will rain on a particular day is 0.64 then find the probability that it will not rain on that day.

15. In the adjoining figure $XY \parallel BC$, $AX = p-3$, $BX = 3$ and $\frac{AY}{CY} = \frac{2}{3}$ then find the value of 'p'



16. If TP and TQ are the tangents of a circle with centre 'O' Then find $m \angle PTQ$



III. Answer the following questions.

17. Prove that $2 - \sqrt{3}$ is irrational.

OR

Find the LCM of 12, 15, and 21 by prime factorisation method.

18. Solve the following given pair of linear equations

$$2x + y = 7 \quad \text{and} \quad 3x + 2y = 11$$

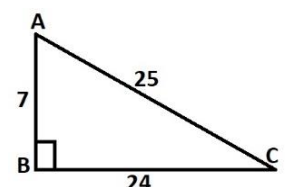
19. Find the 23rd term of an Arithmetic progression 5, 8, 11, 14,

20. Solve the quadratic equation $3x^2 - 7x - 2 = 0$ using quadratic formula.

OR

Find the roots of the quadratic equation $4t^2 - 7t - 2 = 0$ by completing the square method.

21. In a given figure $\angle ABC = 90^\circ$ find (i) $\sin A$ (ii) $\tan C$



8x2=16

22. Find the distance between the points A(3, 2) and B(6, 6) using formula

23. If 'A' is an event of a random experiment such that $P(A) : P(\bar{A}) = 6 : 15$ then find $P(A)$ and $P(\bar{A})$

24. Construct a pair of tangents to a circle of radius 3.5cm from a point 8cm away from the centre of circle.

IV. Answer the following questions

9x3=27

25. One of the zeros of polynomial $p(x) = x^3 + 2x^2 - 5x - 6$ is 2 find remaining zeros of $p(x)$.

26. Find the 'mean' for the following grouped data.

| | | | | | | |
|----------------|------|-------|-------|-------|-------|-------|
| Class-Interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Frequency | 2 | 5 | 9 | 14 | 7 | 3 |

OR

Find the 'mode' for the following grouped data.

| | | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|
| Class-Interval | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 | 65-75 |
| Frequency | 6 | 10 | 15 | 12 | 7 | 5 |

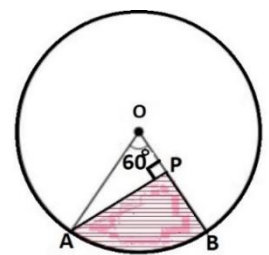
27. The following data represent the daily savings of 70 workers in a factory . Draw 'less than type' ogive for the given data.

| | | | | | | |
|------------------------|---------|---------|---------|---------|---------|---------|
| Daily savings [Rupees] | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 | 350-400 |
| Number of workers | 4 | 8 | 14 | 20 | 18 | 6 |

28. Construct a triangle of sides 5cm , 7 cm and 6 cm. Then construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle.

29. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

30. In the given figure, AOB is a sector of angle 60° of a circle with centre O and radius 17cm. If $AP \perp OB$ and $AP=15$ cm, find the area of the shaded region.

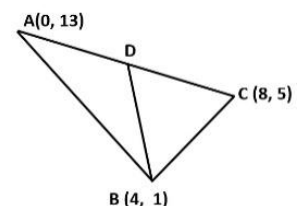


31. Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.

OR

Evaluate:
$$\frac{2\sin(90^\circ - 60^\circ) + \tan 45^\circ + \operatorname{cosec}(90^\circ - 60^\circ)}{\sin 90^\circ + \frac{1}{\sqrt{3}}\tan(90^\circ - 30^\circ) + \operatorname{cosec} 30^\circ}$$

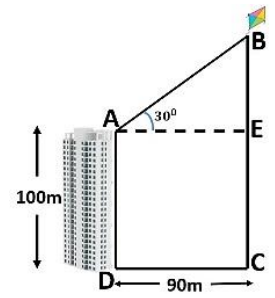
32. In a triangle ΔABC vertices are A(0,13) , B(4,1) & C(8,5) in which BD is a median as shown in the figure . Find the area of triangle ΔABD ?



OR

Find the value of x which coordinates of the point which divides the line segment joining the points A(x, 7) and B(-6, 2) in the ratio 3 : 2 internally at the point P(-2, 4).

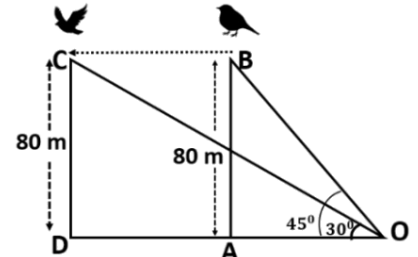
33. From the top of the 100m height building angle of elevation of flying kite is 30° as shown in the figure. From the foot of the building 90m distance a kite is visible 90° above the ground. Find the length of string and also find the height of the kite from ground level?



OR

A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45° . The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30° .

Find the speed of flying of the bird. (Take $\sqrt{3} = 1.73$)



4x4=16

V. Answer the following questions.

34. Find the solution of the given pair of linear equations by graphical method.

$$x + y = 5$$

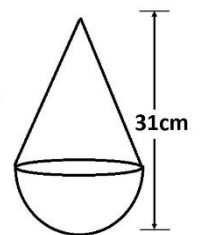
$$2x + y = 8$$

35. In an arithmetic progression sum of 10^{th} and 18^{th} term is 88. Find the difference between sum of first 19 terms and sum of first 8 terms by using suitable formula?

OR

In an arithmetic progression 10^{th} term is more than 24 of its 6^{th} term and 15^{th} term is 87. Find the arithmetic progression also find the sum of first 21 terms by using formula.

36. In a given figure shows a toy made by metal sheet. Its lower part is a hemisphere and the upper part is a cone. Area of metal sheet used to make hemisphere part is 308cm^2 and also height of the toy is 31cm. Find the volume of toy.?



37. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

VI. Answer the following question.

1x5=5

38. State and Prove Pythagoras theorem.
