ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 16]

Total No. of Printed Pages : 16]

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 38]

Total No. of Questions : 38]

A

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ & ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / Regular Fresh & Regular Repeater)

ದಿನಾಂಕ : 04. 04. 2022] [Date : 04. 04. 2022

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-45 ರವರೆಗೆ] [Time : 10-30 A.M. to 1-45 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

General Instructions to the Candidate :

1. This question paper consists of objective and subjective types of 38 questions.
2. This question paper has been sealed by reverse jacket. You have to cut on the right side to open the paper at the time of commencement of the examination. Check whether all the pages of the question paper are intact.
3. Follow the instructions given against both the objective and subjective types of questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. 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. $8 \times 1 = 8$

1. The graphical representation of the pair of lines $x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$ is

   (A) intersecting lines

   (B) parallel lines

   (C) coincident lines

   (D) perpendicular lines.

2. The common difference of the Arithmetic progression 8, 5, 2, – 1, ... is

   (A) – 3

   (B) – 2

   (C) 3

   (D) 8.

3. The standard form of $2x^2 = x - 7$ is

(A) $2x^2 - x = -7$

(B) $2x^2 + x - 7 = 0$

(C) $2x^2 - x + 7 = 0$

(D) $2x^2 + x + 7 = 0$.

4. The value of $\cos(90° - 30°)$ is

(A) -1

(B) $\frac{1}{2}$

(C) 0

(D) 1.

5. The distance of the point $P(x, y)$ from the origin is

(A) $\sqrt{x^2 + y^2}$

(B) $x^2 + y^2$

(C) $x^2 - y^2$

(D) $\sqrt{x^2 - y^2}$

6. In a circle, the angle between the tangent and the radius at the point of contact is

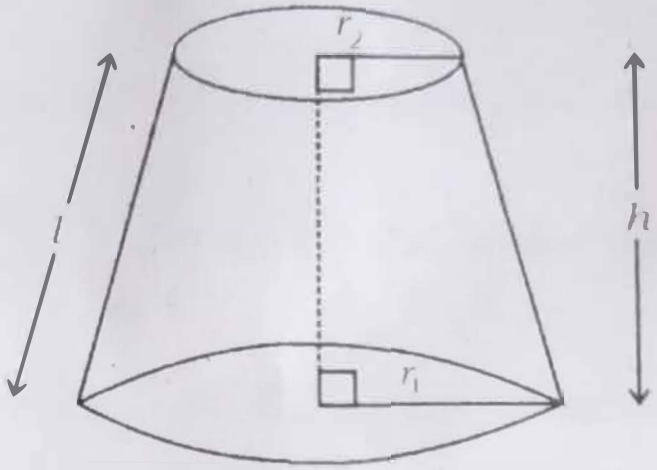
(A) 30°

(B) 60°

(C) 90°

(D) 180°.

7. In the given figure, the volume of the frustum of a cone is



(A) $\pi (r_1 + r_2) l$

(B) $\pi (r_1 - r_2) l$

(C) $\frac{1}{3} \pi h (r_1^2 - r_2^2 - r_1 r_2)$

(D) $\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$

8. Surface area of a sphere of radius 'r' unit is

(A) πr^2 sq.units (B) $2 \pi r^2$ sq.units

(C) $3 \pi r^2$ sq.units (D) $4 \pi r^2$ sq.units.

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

9. If the pair of linear equations in two variables are inconsistent, then how many solutions do they have ?

10. In an Arithmetic progression if 'a' is the first term and 'd' is the common difference, then write its n^{th} term.

11. Write the standard form of quadratic equation.

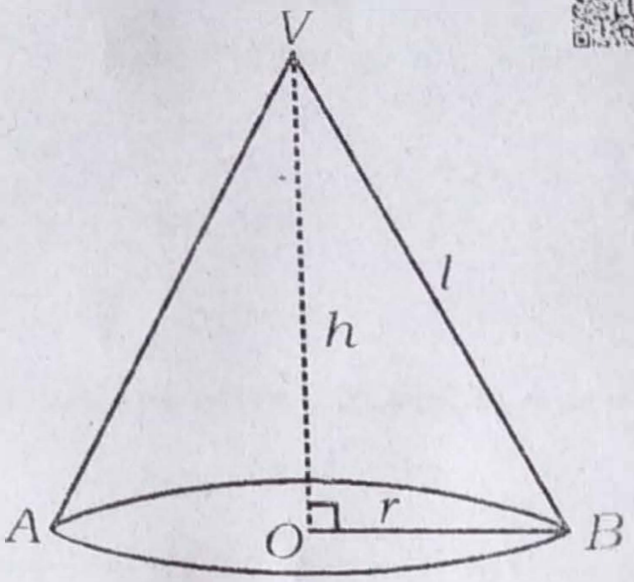
12. Write the value of $\frac{\sin 18^\circ}{\cos 72^\circ}$.

13. Write the distance of the point (4, 3) from x-axis.

14. Find the median of the scores 6, 4, 2, 10 and 7.

15. Write the statement of "Basic Proportionality" theorem (Thales theorem).

16. In the given figure, write the formula used to find the curved surface area of the cone.



III. Answer the following questions : **8 × 2 = 16**

17. Solve the given pair of linear equations by Elimination method :

$2x + y = 8$

$x - y = 1$

18. Find the 30th term of the arithmetic progression 5, 8, 11, ... by using formula.

19. Find the sum of first 20 terms of the Arithmetic progression 10, 15, 20, ... by using formula.

OR

Find the sum of first 20 positive integers using formula.

20. Find the roots of $x^2 + 5x + 2 = 0$ by using quadratic formula.

21. Find the value of the discriminant and hence write the nature of roots of the quadratic equation $x^2 + 4x + 4 = 0$.

22. Find the distance between the points $A(2, 6)$ and $B(5, 10)$ by using distance formula.

OR

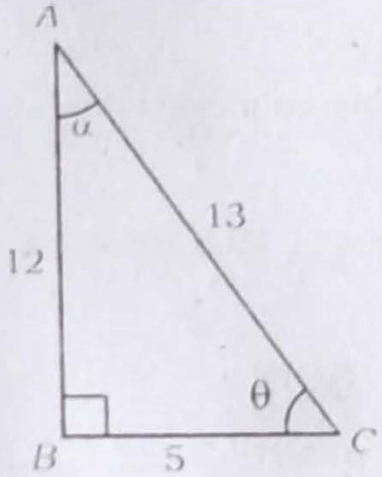
Find the coordinates of the mid-point of the line segment joining the points $P(3, 4)$ and $Q(5, 6)$ by using 'mid-point' formula.

23. Draw a line segment of length 10 cm and divide it in the ratio 2 : 3 by geometric construction.

24. In the given figure find the values of

i) sin 0

ii) tan α.



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

25. The sum of first 9 terms of an Arithmetic progression is 144 and its 9th term is 28. Then find the first term and common difference of the Arithmetic progression.

26. The diagonal of a rectangular field is 60 m more than its shorter side. If the longer side is 30 m more than the shorter side, then find the sides of the field.

OR

In a right angled triangle, the length of the hypotenuse is 13 cm. Among the remaining two sides, the length of one side is 7 cm more than the other side. Find the sides of the triangle.

27. Prove that

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

OR

Prove that $\sec\theta\,(1 - \sin\theta)\,(\sec\theta + \tan\theta) = 1$.

28. Find the coordinates of the point on the line segment joining the points $A(-1, 7)$ and $B(4, -3)$ which divides AB internally in the ratio 2 : 3.

OR

Find the area of triangle PQR with vertices $P(0, 4)$, $Q(3, 0)$ and $R(3, 5)$.

29. Find the mean for the following grouped data by Direct method :

Class-interval	*Frequency*
10 — 20	2
20 — 30	3
30 — 40	5
40 — 50	7
50 — 60	3

OR

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

30. During a medical check-up of 50 students of a class, their heights were recorded as follows :

Draw "less than type" ogive for the given data :

Height in cm	*Number of students (Cumulative frequency)*
Less than 140	5
Less than 145	10
Less than 150	15
Less than 155	25
Less than 160	40
Less than 165	50

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

32. Construct two tangents to a circle of radius 3 cm from a point 8 cm away from its centre.

33. The volume of a solid right circular cylinder is 2156 cm^3. If the height of the cylinder is 14 cm, then find its curved surface area.

[Take $\pi = \frac{22}{7}$]

V. Answer the following questions : **4 × 4 = 16**

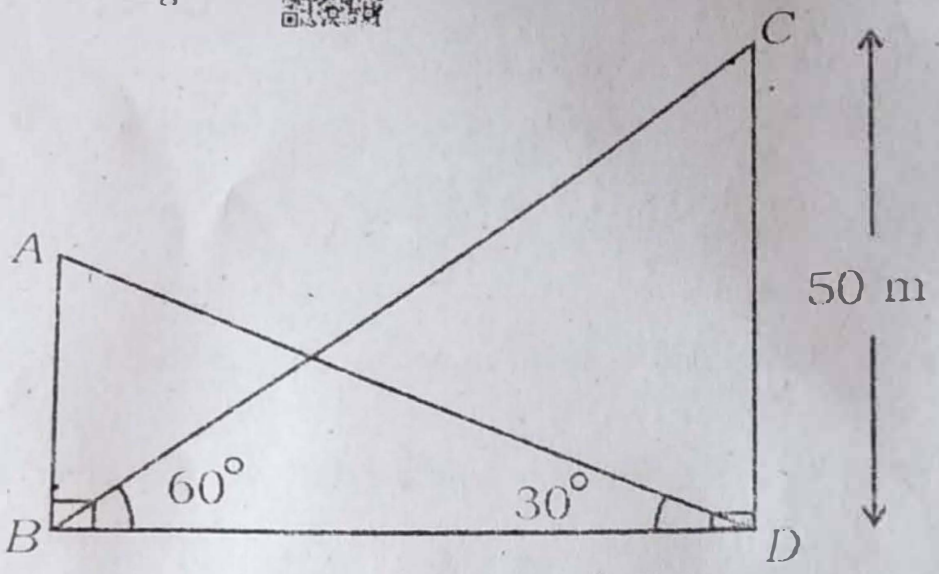
34. Find the solution of the given pair of linear equations by graphical method :

$x + 2y = 6$

$x + y = 5$

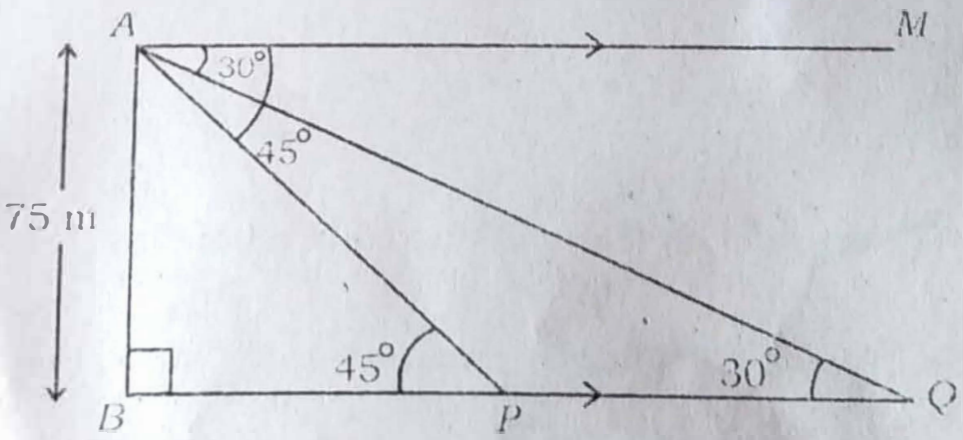
35. The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. Both the tower and building are on the same

level ground. If the height of the tower is 50 m, then find the height of the building.



OR

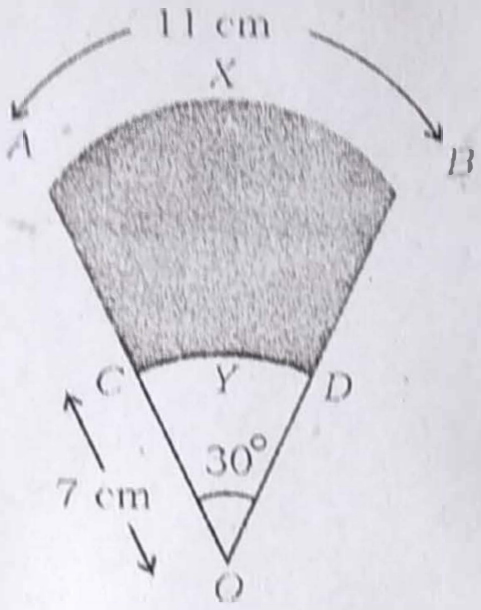
As observed from the top of a 75 m high light house from the sea level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the light house then find the distance between the two ships.



36. Construct a triangle with sides 4·5 cm, 6 cm and 8 cm. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the first triangle.

37. In the figure AXB and CYD are the arcs of two concentric circles with centre O. The length of the arc AXB is 11 cm. If $OC = 7$ cm and $\angle AOB = 30°$, then find the area of the shaded region.

[Take $\pi = \frac{22}{7}$]



VI. Answer the following question : 1 × 5 = 5

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

2 ● RF(A)/100/3311

ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 16]

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ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 38]

Total No. of Questions : 38]

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Code No. : 81-E

A

CCE RF
UNREVISED
FULL SYLLABUS

Question Paper Serial No. **100**

6049 37

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / **English Medium**)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / **Regular Fresh**)

ದಿನಾಂಕ : 03. 04. 2023]

[Date : 03. 04. 2023

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-45 ರವರೆಗೆ]

[Time : 10-30 A.M. to 1-45 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80]

[Max. Marks : 80

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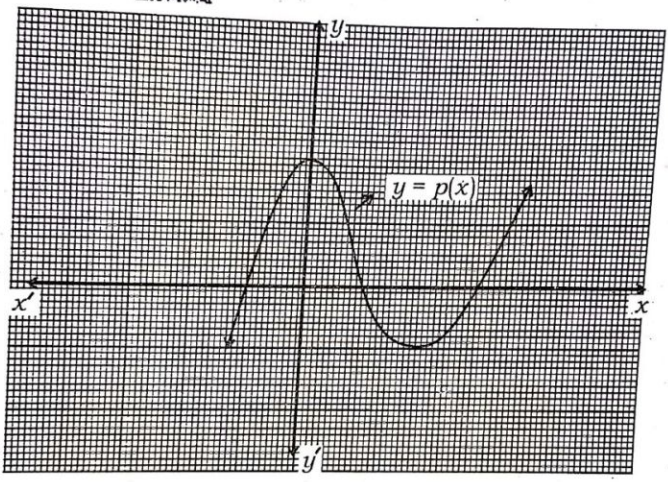
[Turn over

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. $8 \times 1 = 8$

1. The number of zeroes of the polynomial $y = p(x)$ in the given graph is



(A) 3 (B) 2

(C) 1 (D) 4

2. For an event '*E*', if $P(E) = 0{\cdot}75$, then $P(\overline{E})$ is

(A) 2·5 (B) 0·25

(C) 0·025 (D) 1·25

3. The total surface area of a right circular cylinder having radius 'r' and height 'h' is

(A) $\pi r(r+h)$

(B) $2\pi rh$

(C) $2\pi r(r-h)$

(D) $2\pi r(r+h)$

4. The number that represents the remainder when $19 = 6 \times 3 + 1$ is compared with Euclid's division lemma $a = bq + r$ is

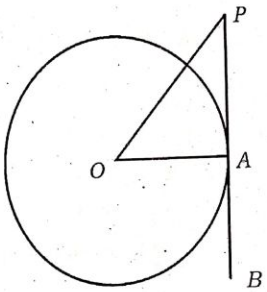
(A) 3

(B) 6

(C) 1

(D) 19

5. In the given figure, PB is a tangent drawn at the point A to the circle with centre 'O'. If $\angle AOP = 45°$, then the measure of $\angle OPA$ is



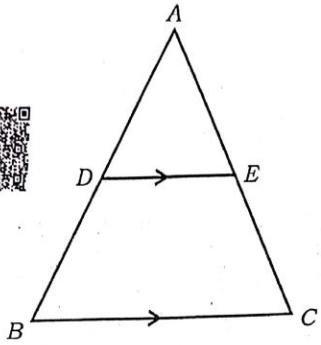
(A) 45°

(B) 90°

(C) 35°

(D) 65°

6. In the figure, if $DE \parallel BC$, then the correct relation among the following is



(A) $\frac{AD}{AB} = \frac{AE}{EC}$

(B) $\frac{AD}{DB} = \frac{EC}{AE}$

(C) $\frac{AD}{DB} = \frac{AE}{EC}$

(D) $\frac{DB}{AD} = \frac{AE}{EC}$

7. The lines represented by the equations $4x + 5y - 10 = 0$ and $8x + 10y + 20 = 0$ are

(A) intersecting lines

(B) perpendicular lines to each other

(C) coincident lines

(D) parallel lines

8. The distance of the point $(-8, 3)$ from the x-axis is

(A) -8 units

(B) 3 units

(C) -3 units

(D) 8 units

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

9. Express the denominator of $\frac{7}{80}$ in the form of $2^n \times 5^m$.

10. If the pair of lines represented by the linear equations $x + 2y - 4 = 0$ and $ax + by - 12 = 0$ are coincident lines, then find the values of 'a' and 'b'.

11. $\Delta ABC \sim \Delta PQR$. Area of the ΔABC is 64 cm^2 and the area of the ΔPQR is 100 cm^2. If $AB = 8$ cm, then find the length of PQ.

12. Express the equation $x\,(2 + x) = 3$ in the standard form of a quadratic equation.

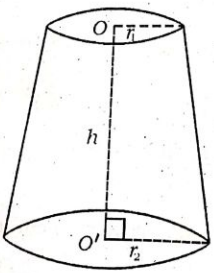
13. Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$.

14. Find the coordinates of the mid-point of the line segment joining the points (6, 3) and (4, 7).

15. Write the degree of the polynomial

$P(x) = 3x^3 - x^4 + 2x^2 + 5x + 2.$

16. Write the formula to find the volume of the frustum of a cone given in the figure.



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

17. Show that $5 + \sqrt{3}$ is an irrational number.

OR

Find the H.C.F. of 72 and 120 by using Euclid's division algorithm.

18. Solve the given pair of linear equations :

$3x + y = 12$

$x + y = 6$

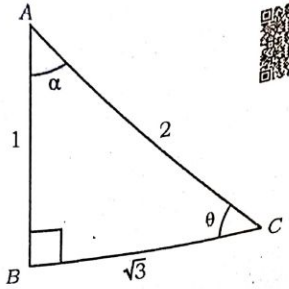
19. Find the 20^{th} term of the Arithmetic progression 4, 7, 10, ... by using formula.

20. Find the roots of the equation $2x^2 - 5x + 3 = 0$ by using 'quadratic formula'.

OR

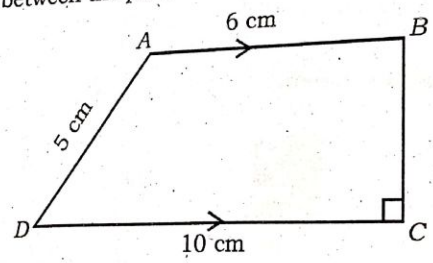
Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

21. In the given figure, if $\angle ABC = 90°$, then find the values of $\sin\theta$ and $\cos\alpha$.



22. A box contains cards which are numbered from 9 to 19. If one card is drawn at random from the box, find the probability that it bears a prime number.

23. In the given figure, $ABCD$ is a trapezium in which $AB \parallel DC$, and $BC \perp DC$. If $AB = 6$ cm, $CD = 10$ cm and $AD = 5$ cm, then find the distance between the parallel lines.



24. Draw a circle of radius 4 cm and construct a pair of tangents to the circle such that the angle between them is 60°.

IV. Answer the following questions : $9 \times 3 = 27$

25. Divide $p(x) = 3x^3 + x^2 + 2x + 5$ by $g(x) = x^2 + 2x + 1$ and find the quotient [$q(x)$] and remainder [$r(x)$].

OR

Find the zeroes of the quadratic polynomial $p(x) = x^2 + 7x + 10$, and verify the relationship between zeroes and the coefficients.

26. Prove that

$$\sqrt{\frac{1+\cos A}{1-\cos A}} = \text{cosec } A + \cot A$$

OR

Prove that

$$\frac{\sin A}{1+\cos A} + \frac{1+\cos A}{\sin A} = 2 \text{ cosec } A.$$

27. Find the mean for the following data :

Class-interval	*Frequency*
1 – 5	4
6 – 10	3
11 – 15	2
16 – 20	1
21 – 25	5

OR

Find the mode for the following data :

Class-interval	Frequency
1 – 3	6
3 – 5	9
5 – 7	15
7 – 9	9
9 – 11	1

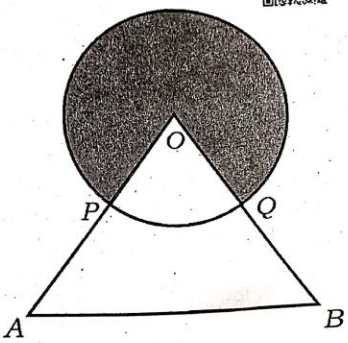
28. Find the ratio in which the line segment joining the points $A(-6, 10)$ and $B(3, -8)$ is divided by the point $(-4, 6)$.

OR

Find the area of a triangle whose vertices are $A(1, -1)$, $B(-4, 6)$ and $C(-3, -5)$

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

30. In the given figure, 'O' is the centre of a circle and OAB is an equilateral triangle. P and Q are the mid-points of OA and OB respectively. If the area of $\Delta\ OAB$ is $36\sqrt{3}\ cm^2$, then find the area of the shaded region.



31. Construct a triangle with sides 5 cm, 6 cm and 8 cm and then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the first triangle.

32. The distance between two cities 'A' and 'B' is 132 km. Flyovers are built to avoid the traffic in the intermediate towns between these cities. Because of this, the average speed of a car travelling in this route through flyovers increases by 11 km/h and hence, the car takes 1 hour less time to travel the same distance than earlier. Find the current average speed of the car.

33. A life insurance agent found the following data for distribution of ages of 100 policy holders. Draw a "Less than type ogive" for the given data :

Age (in years)	*Number of policy holders (cumulative frequency)*
Below 20	2
Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	100

V. Answer the following questions : **4 × 4 = 16**

34. The sum of 2nd and 4th terms of an arithmetic progression is 54 and the sum of its first 11 terms is 693. Find the arithmetic progression. Which term of this progression is 132 more than its 54th term ?

OR

The first and the last terms of an arithmetic progression are 3 and 253 respectively. If the 20th term of the progression is 98, then find the arithmetic progression. Also find the sum of the last 10 terms of this progression.

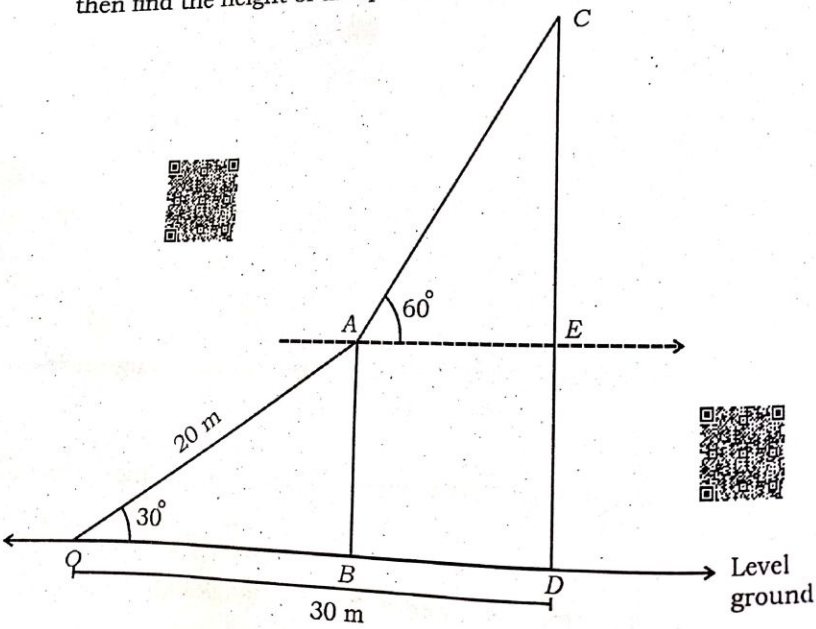
35. Find the solution of the given pair of linear equations by graphical method :

$2x + y = 8$

$x - y = 1$

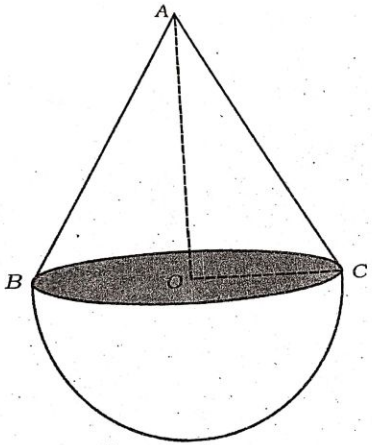
36. Prove that "If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar".

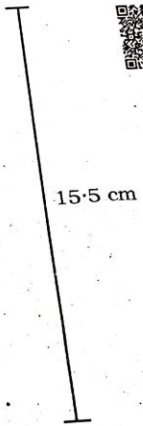
37. In the given figure, a rope is tightly stretched and tied from the top of a vertical pole to a peg on the same level ground such that the length of the rope is 20 m and the angle made by it with the ground is 30°. A circus artist climbs the rope, reaches the top of the pole and from there he observes that the angle of elevation of the top of another pole on the same ground is found to be 60°. If the distance of the foot of the longer pole from the peg is 30 m, then find the height of this pole. (Take $\sqrt{3} = 1{\cdot}73$)



VI. Answer the following question : $1 \times 5 = 5$

38. A wooden solid toy is made by mounting a cone on the circular base of a hemisphere as shown in the figure. If the area of base of the cone is $38{\cdot}5\ cm^2$ and the total height of the toy is 15·5 cm, then find the total surface area and volume of the toy.





CCE RF/PF/RR/PR/NSR/NSPR(A)/666/032

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ಮಾರ್ಚ್/ಏಪ್ರಿಲ್ 2024 ರ ಪರೀಕ್ಷೆ - 1

MARCH/APRIL 2024 EXAMINATION-1

ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 16]

Total No. of Printed Pages : 16]

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 38]

Total No. of Questions : 38]

CCE RF/PF/RR/ PR/NSR/NSPR FULL SYLLABUS

Question Paper Serial No. **0108693**

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Code No. : 81-E

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / **English Medium**)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / ಶಾಲಾ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ / ಎನ್.ಎಸ್.ಆರ್. / ಎನ್.ಎಸ್.ಪಿ.ಆರ್.)

(Regular Fresh / Private Fresh / Regular Repeater / Private Repeater / NSR / NSPR)

ದಿನಾಂಕ : 02. 04. 2024] [Date : 02. 04. 2024

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-15 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-30 ರವರೆಗೆ] [Time : 10-15 A.M. to 1-30 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

ಇಲ್ಲಿಂದ ಕತ್ತರಿಸಿ

TEAR HERE TO OPEN THE QUESTION PAPER

ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಇಲ್ಲಿ ಕತ್ತರಿಸಿ

02. 04. 2024

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General Instructions to the Candidate :

1. This question paper consists of 38 questions in all.
2. This question paper has been sealed by reverse jacket. ***You have to cut on the right side to open the paper*** at the time of commencement of the examination ***(Follow the arrow)***. **Do not cut the left side to open the paper.** Check whether all the pages of the question paper are intact.
3. Follow the instructions given against the questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. 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.
6. Ensure that the Version of the question paper distributed to you and the Version printed on your admission ticket is the same.

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. $8 \times 1 = 8$

1. The product of HCF and LCM of two numbers 15 and 20 is

(A) 15 (B) 20

(C) 300 (D) 35

2. If α and β are the zeroes of the quadratic polynomial

$p(x) = ax^2 + bx + c$, then $\alpha\beta$ is

(A) $\frac{b}{a}$ (B) $\frac{-b}{a}$

(C) $\frac{-c}{a}$ (D) $\frac{c}{a}$

3. If $\sin 0 = \frac{4}{5}$, then the value of $\sqrt{1 - \cos^2 0}$ is

(A) $\frac{16}{25}$

(B) $\frac{4}{5}$

(C) $\frac{5}{4}$

(D) $\frac{9}{25}$

4. The probability of a sure event is

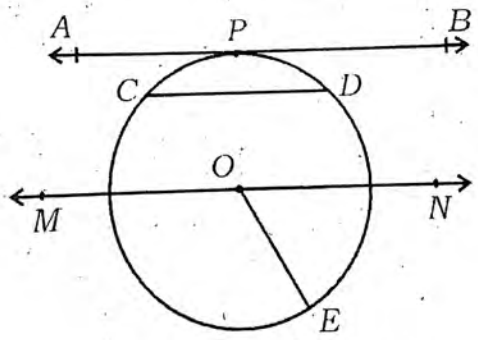
(A) 1

(B) ·0

(C) – 1

(D) 1·5

5. The secant of the circle in the figure, is



(A) *MN*

(B) *OE*

(C) *CD*

(D) *AB*

6. The volume of the frustum of a cone whose base radii are r_1 and r_2 and height 'h', is

(A) $\frac{1}{3}\pi (r_1 + r_2 + r_1 . r_2) h$

(B) $\frac{1}{3}\pi ({r_1}^2 + {r_2}^2 - r_1 . r_2) h$

(C) $\frac{1}{3}\pi ({r_1}^2 + {r_2}^2 + r_1 . r_2) h$

(D) $\frac{1}{3}\pi ({r_1}^2 - {r_2}^2 - r_1 . r_2) h$

7. If 2, x, 26 are in Arithmetic progression, then the value of x is

(A) 12

(B) 14

(C) 28

(D) 24

8. If $\tan (90° - \theta) = \sqrt{3}$, then the value of $\cot \theta$ is

(A) $\frac{1}{\sqrt{3}}$

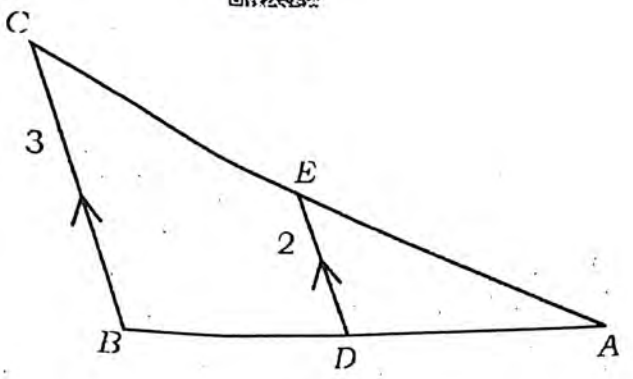
(B) 1

(C) 0

(D) $\sqrt{3}$

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

9. In the figure, $\Delta ADE \sim \Delta ABC$ and $DE : BC = 2 : 3$. Find $\frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC}$.



10. The radii of the base and the height of a cylinder and a cone are same. If the volume of the cylinder is 27 cubic units, then find the volume of the cone.

11. If $200 = 2^m \times 5^n$, then find the values of m and n.

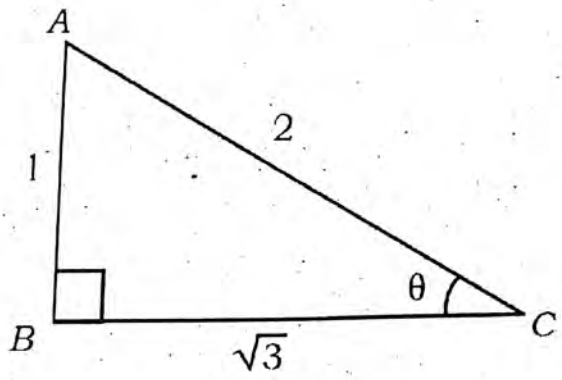
12. Find the number of solutions of the pair of linear equations $2x - 3y + 4 = 0$ and $3x + 5y + 8 = 0$.

13. In an Arithmetic progression, sum of the first six terms and sum of the first five terms are 78 and 55 respectively. Then find the sixth term of the progression.

14. Write the degree of the polynomial $p(x) = x(x^2 + 3) + 5x^2 + 7$.

15. If the value of discriminant of a quadratic equation is zero, then write the nature of roots of the quadratic equation.

16. Find the value of θ in the figure.



III. Answer the following questions : **8 × 2 = 16**

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

18. Solve the given pair of linear equations by Elimination method :

$2x + y = 8$

$3x - y = 7$

19. Find the sum of first 20 terms of the Arithmetic progression 1, 5, 9, ... using formula.

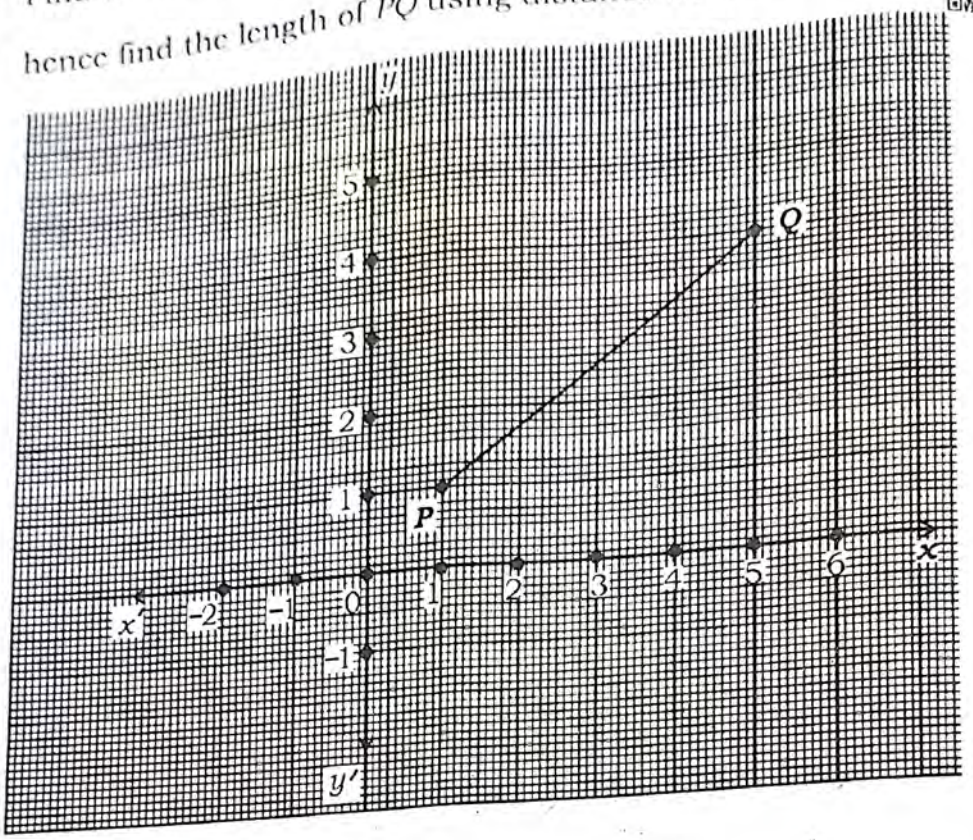
20. Find the roots of the quadratic equation $2x^2 - 3x - 1 = 0$ using quadratic formula.

21. Prove that $\frac{\cos\theta - \sin\theta \cdot \cos\theta}{\cos\theta + \sin\theta \cdot \cos\theta} = \frac{\text{cosec}\,\theta - 1}{\text{cosec}\,\theta + 1}$

OR

Prove that $\frac{\sin 30^\circ + \cos 60^\circ}{\text{cosec}\,30^\circ - \cot 45^\circ} = \sin 90^\circ.$

22. Find the coordinates of the point P and Q in the given graph and hence find the length of PQ using distance formula.



OR

Find the coordinates of the point which divides the line segment joining the points (4, – 3) and (8, 5) in the ratio 3 : 1 internally.

23. A basket contains 36 mangoes. $\frac{1}{4}$th of them are rotten and others are good. If one mango is drawn at random from the basket, then find the probability of getting a good mango.

24. Draw a circle of radius 3·5 cm and construct a pair of tangents to the circle such that the angle between the tangents is 60°.

IV. Answer the following questions : $9 \times 3 = 27$

25. Divide $p(x) = x^3 + 3x^2 + 4x + 5$ by $g(x) = x^2 - x + 1$ and find the quotient $[q(x)]$ and remainder $[r(x)]$.

OR

When the polynomial $p(x) = x^3 + 4x^2 + 5x - 2$ is divided by the polynomial $g(x)$, the quotient $[q(x)]$ and remainder $[r(x)]$ are $x^2 - x + 2$ and 4 respectively. Find $g(x)$.

26. Find the mean for the following data :

Class-interval	*Frequency*
2 – 6	2
7 – 11	4
12 – 16	5
17 – 21	3
22 – 26	1

OR

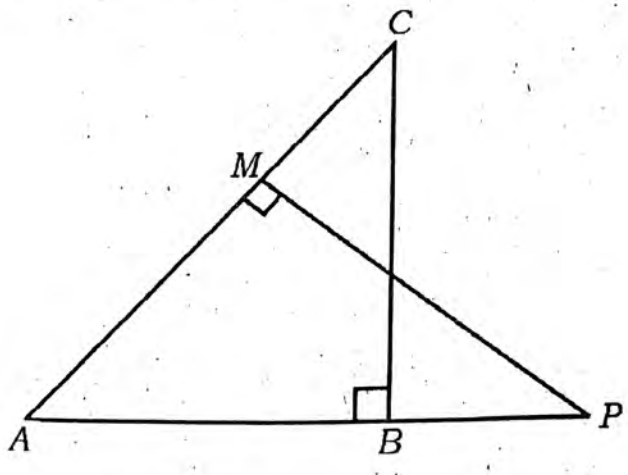
Find the mode for the following data :

Class-interval	Frequency
1 – 5	1
5 – 9	3
9 – 13	7
13 – 17	10
17 – 21	9

27. 'D' is a point on the side BC of a ΔABC such that $\angle ADC = \angle BAC$. Then prove that $AC^2 = BC \cdot CD$.

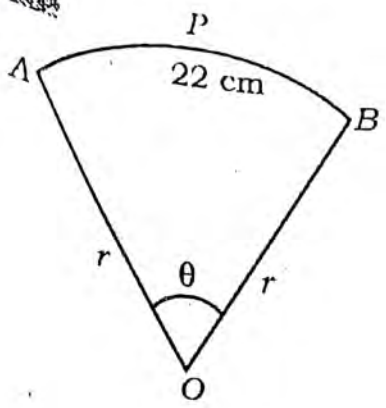
OR

In the figure, ΔABC and ΔAMP are right angled triangles, right angled at B and M respectively. Then prove that $\frac{CA}{PA} = \frac{BC}{MP}$.



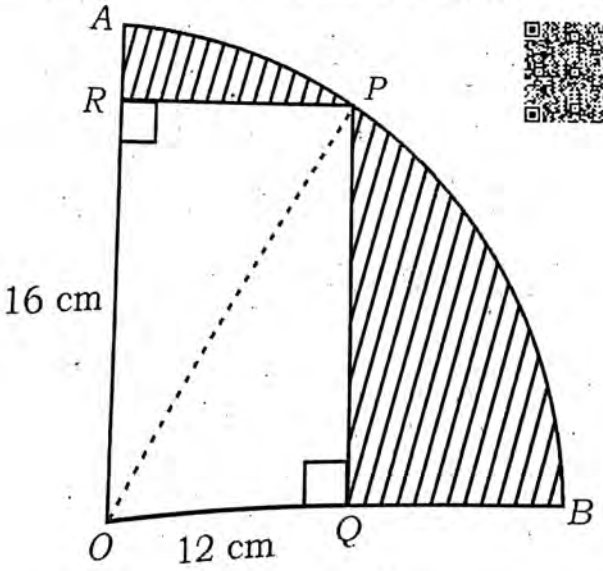
28. Prove that "The lengths of tangents drawn from an external point to a circle are equal".

29. In the figure area of sector $AOBPA$ of radius 'r' is 231 cm^2 and the length of the arc APB is 22 cm. Find the radius of the sector and angle θ.



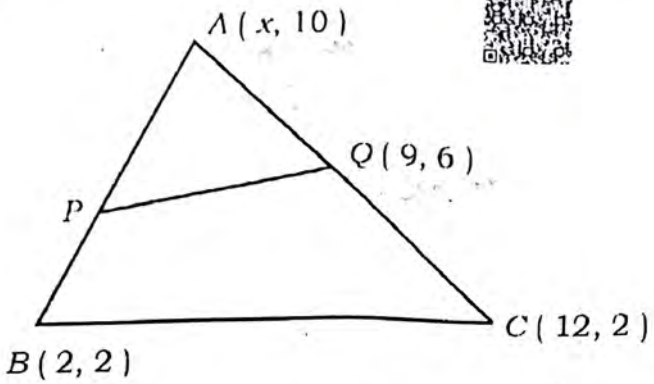
OR

In the figure a rectangle $ROQP$ is inscribed in the quadrant of a circle. If the length and breadth of the rectangle are 16 cm and 12 cm respectively, find the area of the shaded region.



30. Age of mother is twice the square of age of her son. After 8 years mother's age becomes 4 years more than the thrice of age of her son. Find their present ages.

31. In the figure, ABC is a triangle whose vertices are $A\ (x,\ 10)$, $B\ (2,\ 2)$ and $C\ (12,\ 2)$. If $Q\ (9,\ 6)$ is the mid-point of AC and area of $\triangle APQ$ is 12 cm^2, then find the area of quadrilateral $PBCQ$.



32. The ages of 100 patients admitted in a hospital are as follows. Draw a "less than type ogive" for the given data :

Age (in years)	*Number of patients* (*cumulative frequency*)
Less than 10	6
Less than 20	15
Less than 30	38
Less than 40	46
Less than 50	65
Less than 60	84
Less than 70	100

33. Construct a triangle with sides 6 cm, 8 cm and 9 cm and then construct another triangle whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

V. Answer the following questions : $4 \times 4 = 16$

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

$$2x + y = 8$$

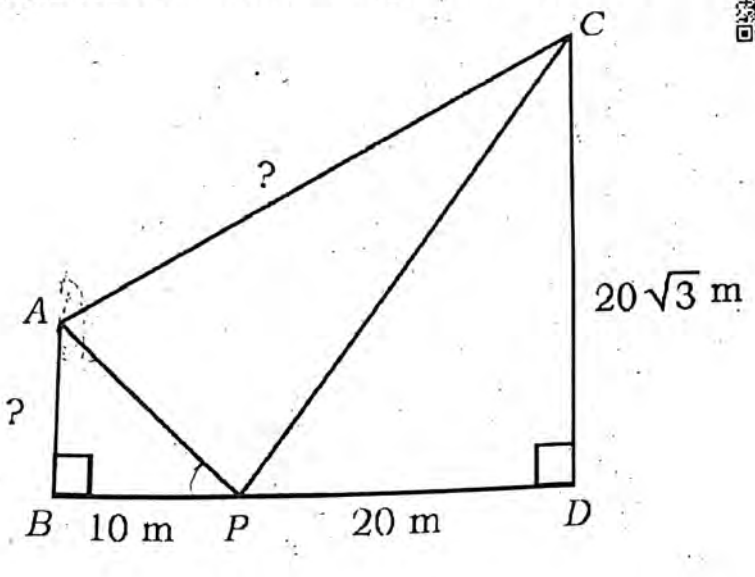
$$x + y = 5$$

35. In an Arithmetic progression the sum of first n terms is 210 and the sum of first $(n - 1)$ terms is 171. If the first term of the Arithmetic progression is 3, then find the Arithmetic progression and find its 20^{th} term.

OR

The sum of interior angles of a polygon of 'n' sides is $(n-2)\,180°$. If the interior angles of a pentagon are in Arithmetic progression and its least angle is 72°, then find all the interior angles of the pentagon.

36. In the figure the poles AB and CD of different heights are standing vertically on a level ground. From a point P on the line joining the foots of the poles on the level ground, the angles of elevation to the tops of the poles are found to be complementary. The height of CD and the distance PD are $20\sqrt{3}$ m and 20 m respectively. If BP is 10 m, then find the length of the pole AB and the distance AC between the tops of the poles.



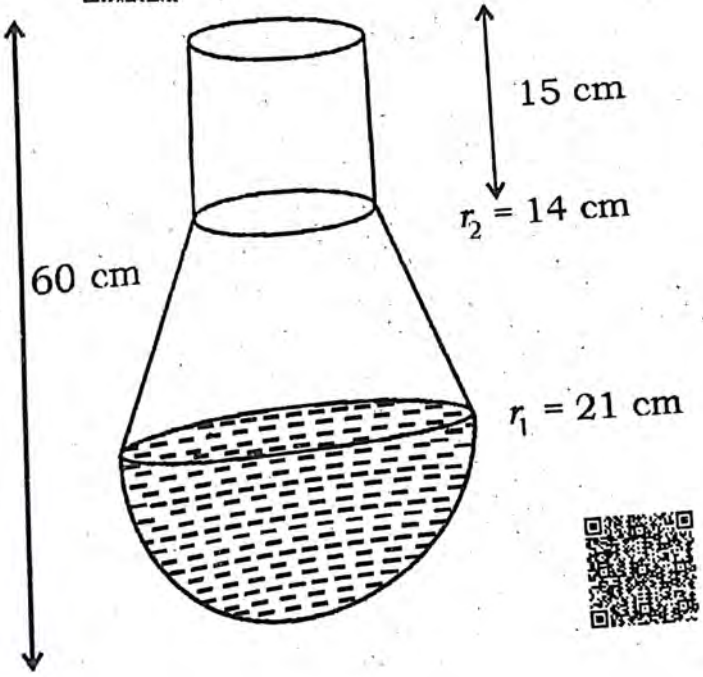
37. Prove : "Basic proportionality theorem" or "Thales theorem".

VI. Answer the following question :

$1 \times 5 = 5$

38. An insect control device made of a cylinder, a frustum of a cone and a hemisphere attached to each other is as shown in the figure. Sticky liquid is completely filled in the hemispherical part.

If the radii of hemisphere and cylinder are 21 cm and 14 cm respectively and total height of the device is 60 cm and height of the cylinder is 15 cm, then calculate the curved surface area of the device and also find the quantity of the sticky liquid in the hemisphere.



S 1531

Sl. No.

SSLC EXAMINATION, MARCH - 2020

MATHEMATICS

(English)

Time : 2½ Hours | Total Score : 80

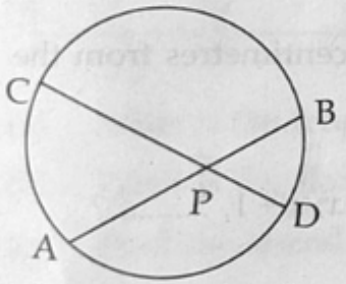
INSTRUCTIONS :

- Read each question carefully before writing the answer.
- Give explanations wherever necessary.
- First 15 minutes is Cool-off time. You may use this time to read the questions and plan your answers.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc., using approximations unless you are asked to do so.

Answer **any three** questions from **1** to **4**. Each question carries **2** scores. **Score 3x2=6**

1. (a) Write the 6^{th} term of the arithmetic sequence 1, 25, 49, 73, 97, ...
   (b) How many perfect square terms are there in the arithmetic sequence 97, 73, 49, ... ?

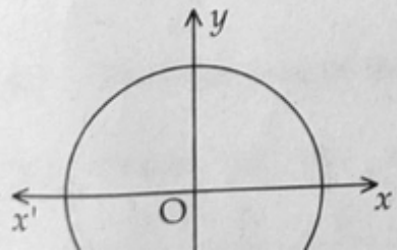
2. Chords AB and CD are intersecting at P. AB = 10 centimetres, PB = 4 centimetres and PD = 3 centimetres.



   (a) What is the length of PA ?
   (b) Find the length of PC.

3. Write the polynomial $p(x) = x^2 - 4$ as the product of two first degree polynomials.

4. In the figure, O is the centre of the circle and $x^2 + y^2 = 25$ is the equation of the circle.



8

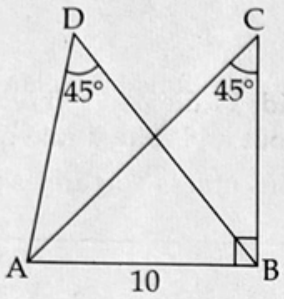
Score
5x3=15

Answer **any five** questions from **5** to **11**. Each question carries **3** scores.

5. (a) Write the first term and the common difference of the arithmetic sequence whose algebraic expression is $3n+5$.

   (b) First term of an arithmetic sequence is 8 and the common difference is 5. Write its algebraic form.

6. In the figure, $\angle ABC = 90°$, $\angle C = \angle D = 45°$, AB = 10 centimetres.



   (a) What is the length of AC ? $10\sqrt{2}$

   (b) What is the radius of the circumcircle of triangle ABC ?

   (c) What is the radius of the circumcircle of triangle ABD ?

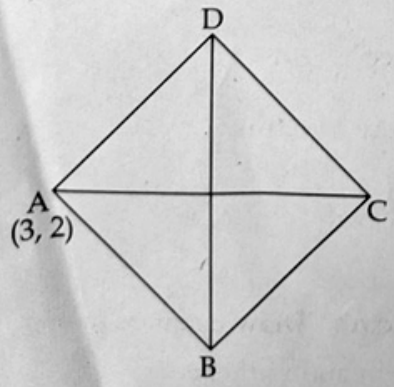
7. Draw a circle of radius 3 centimetres. Mark a point P at a distance 6 centimetres from the centre of the circle. Draw tangents from P to the circle.

8. (a) What is the common difference of the arithmetic sequence $x-1$, x, $x+1$, ... ?

   (b) If $x-1$ is an even number, which is the next even number ?

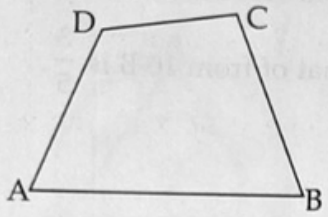
   (c) Prove that the product of two consecutive even numbers added to 1 gives a perfect square.

9. In the figure, ABCD is a square. Its diagonals are parallel to the coordinate axes. AC = 6 and the coordinates of A is (3, 2) write the coordinates of the vertices C, B and D.



Score

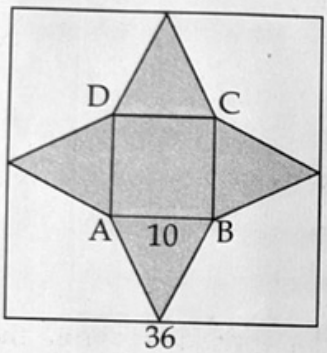
10. In the figure, ABCD is a cyclic quadrilateral. Also $\angle A + \angle D = 210°$, $\angle D + \angle C = 250°$.



(a) What is $\angle A + \angle C$?

(b) Find the measures of $\angle A$ and $\angle C$.

11. The figure of a square sheet of paper is shown below. Length of one side of the paper sheet is 36 centimetres and AB = 10 centimetres. The shaded portion is cut out and folded into a square pyramid.



(a) What is the length of the base edge of the pyramid ?

(b) What is the slant height of the pyramid ?

(c) Find the lateral surface area of the pyramid.

Answer **any seven** questions from **12** to **21**. Each question carries **4** scores. **7x4=28**

12. (a) What is the sum of the first 5 terms of the arithmetic sequence 1, 3, 5, 7, ... ?

(b) What is the sum of the first n terms of the arithmetic sequence 1, 3, 5, 7, ... ?

(c) Find the sum of the first n terms of the arithmetic sequence $\frac{1}{n}, \frac{3}{n}, \frac{5}{n}, \frac{7}{n}, \ldots\ldots\ldots$

(d) What is the sum of first 2020 terms of the arithmetic sequence $\frac{1}{2020}, \frac{3}{2020}, \frac{5}{2020}, \ldots\ldots\ldots$?

13. Draw a rectangle of length 4 centimetres and breadth 2 centimetres. Draw a square having the same area of the rectangle.

14. In a school, the total number of students in 10 A division is equal to the total number of students in 10 B. One student is to be selected from each division. Number of boys in 10 A is 20. The probability of selecting a boy from 10 A is $\frac{2}{5}$ and that of from 10 B is $\frac{3}{5}$.

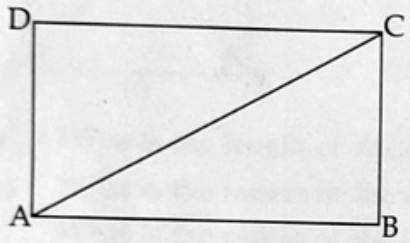
(a) How many students are there in 10 A ?

(b) What is the probability of selecting a girl from 10 A ?

(c) How many boys are there in 10 B ?

(d) What is the probability of both the selected students being boys ?

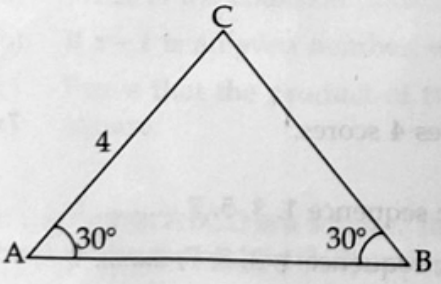
15. Perimeter of the rectangle in the figure is 36 centimetres. $AC = \sqrt{164}$ centimetres.



(a) What is $AB + BC$?

(b) Find the length of AB.

16. In triangle ABC, $\angle A = \angle B = 30°$, $AC = 4$ centimetres.



(a) What is the length of BC ?

(b) Find the length of AB.

(c) In triangle PQR, $PQ = 4\sqrt{3}$ centimetres, $\angle P = \angle Q = 30°$. Draw the triangle.

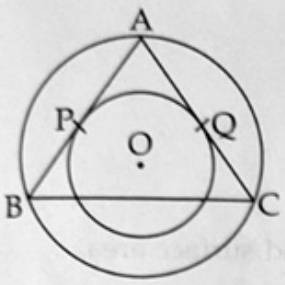
17. (a) If $p(x) = x^2 - 7x + 13$, What is $p(3)$?

(b) Write the polynomial $p(x) - p(3)$ as the product of two first degree polynomials.

(c) Find the solutions of the equation $p(x) - p(3) = 0$.

Score

18. In the figure, O is the centre of both the circles. AB and AC touch the small circle at P and Q. A, B and C are points on the large circle.



(a) If AP = 5 centimetres, then what is the length of AQ ?

(b) Prove that AB = AC.

(c) If AP = 5 centimetres and $\angle A = 90°$, then what is the radius of the small circle ?

19. Draw the coordinate axes and mark the points A(−3, 0), B(3, 0) and C(0, $3\sqrt{3}$).

20. A sector of radius 12 centimetres and central angle 120° is rolled up into a cone.

(a) What is the slant height of the cone ?

(b) Find the radius and the height of the cone.

(c) What is the central angle of the sector to be used to make a cone of base radius $\sqrt{2}$ centimetres and height 4 centimetres ?

21. (a) What is the slope of the line passing through the points (5, 0) and (3, 2) ? Write the equation of the line.

(b) The x coordinate of a point on the line $x - y = 5$ is 5. What is the y coordinate of that point ?

(c) Write the coordinates of the point of intersection of the lines $x + y = 5$ and $x - y = 5$.

Answer **any five** questions from **22** to **28**. Each question carries **5** scores. **5x5=25**

22. Sum of the first 4 terms of an arithmetic sequence is 72. Sum of the first 9 terms is also 72.

(a) What is the 5^{th} term of the sequence ?

(b) Find the sum of the first five terms.

(c) Write the sequence.

23. A boy standing at the edge of a canal sees the top of a tree on the other edge at an elevation of 60°. Stepping 12 metres back, he sees it at an elevation of 30°. Find the height of the tree.

24. In ΔABC, AB = 5 centimetres, $\angle A = 65°$, $\angle B = 55°$. Draw the triangle ABC and draw the incircle. Measure the radius of the incircle.

Score

25. A circle is drawn with (5, 3) as centre. (5, 6) is a point on the circle.

(a) What is the radius of the circle ?

(b) Write the equation of the circle.

(c) What is the distance from the centre of the circle to the x-axis ?

(d) What is the length of the tangents from the origin to the circle ?

26. (a) The radius of a solid sphere is 6 centimetres. Find its volume and surface area.

(b) It is cut into two equal halves. What is the total surface area of each hemisphere ? What is the volume of a hemisphere ?

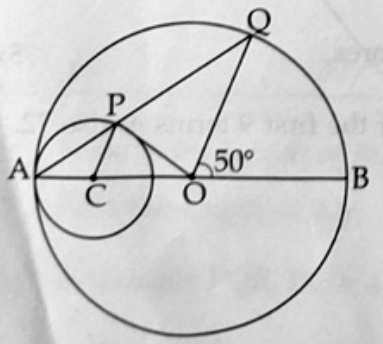
27. The table below shows, children of a class sorted according to their marks in an examination.

Marks	Number of Children
0-10	4
10-20	7
20-30	10
30-40	12
40-50	8
	41

(a) If we arrange the children from the one with the least mark to the one with the greatest, then what will be the assumed mark of the 12^{th} student ?

(b) Compute the median mark.

28. In the figure, O is the centre of the large circle. Centre of the small circle is C. OP is a tangent to the small circle. $\angle BOQ = 50°$.



(a) $\angle OAQ =$ .....

(b) $\angle OCP =$ .....

(c) $\angle APO =$ .....

(d) $\angle POQ =$ .....

Course Mate

Score

29. Read the following Passage. Understand the Mathematical concept in it and answer the questions that follow. Each question carries 1 score. 6x1=6

The common difference of the arithmetic sequence 15, 14, 13, 12, ... is $14-15=-1$. First term of the sequence is 15 and the 15^{th} term is $15+14\times-1=15-14=1$.

Similarly the 4^{th} term is 12 and the 12^{th} term is 4.

Its 16^{th} term is, $x_{16}=15+15\times-1=15-15=0$. So the sum of the first 31 terms is also zero. That is if the n^{th} term of an arithmetic sequence with common difference -1 is m, then the m^{th} term is n and the $(m+n)^{th}$ term is zero.

(a) Seventh term of an arithmetic sequence is 10 and the 10^{th} term is 7. What is the common difference ?

(b) What is the 21^{st} term of the arithmetic sequence 21, 20, 19, ... ?

(c) 5^{th} term of an arithmetic sequence is 17 and the 17^{th} term is 5. Which term of the sequence is zero ?

(d) 5^{th} term of an arithmetic sequence is 17 and the 17^{th} term is 5. What is the 44^{th} term ?

(e) First term of an arithmetic sequence is n and the n^{th} term is 1. What is the $(n+1)^{th}$ term ?

(f) The first term of an arithmetic sequence is n and the n^{th} term is 1. Sum of how many terms, starting from the first term, of this sequence is zero ?

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ಮಾರ್ಚ್/ಏಪ್ರಿಲ್ 2025 ರ ಪರೀಕ್ಷೆ-1
MARCH/APRIL 2025 EXAMINATION-1

[ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 16

[Total No. of Printed Pages : 16

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[Total No. of Questions : 38

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CCE RF/PF

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Code No. : 81-E

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ)

(Regular Fresh / Private Fresh)

ದಿನಾಂಕ : 24. 03. 2025] [Date : 24. 03. 2025

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-00 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-15 ರವರೆಗೆ] [Time : 10-00 A.M. to 1-15 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

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General Instructions to the Candidate :

1. This question paper consists of 38 questions.
2. This question paper has been sealed by reverse jacket. ***You have to cut on the right side to open the paper*** at the time of commencement of the examination ***(Follow the arrow mark)***. **Do not cut the left side to open the paper.** Check whether all the pages of the question paper are intact.
3. Follow the instructions given against the questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. 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.
6. Ensure that the Version of the question paper distributed to you and the Version printed on your admission ticket is the same.

TEAR HERE TO OPEN THE QUESTION PAPER
ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಇಲ್ಲಿ ಕತ್ತರಿಸಿ

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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.** **8 × 1 = 8**

1. LCM of 2 and 3 is

(A) 2 (B) 3

(C) 5 (D) 6

2. If the lines represented by the equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are coincident, then the correct relation is

(A) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (B) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (D) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$

3. The quadratic equation in the following is

(A) $x^3 - 6x$ (B) $p(x) = x^2 + 7x$

(C) $3x = 9$ (D) $x^2 + 3x + 4 = 0$

4. In the following, the shapes which are always similar, are

(A) any two equilateral triangles

(B) square and rectangle

(C) square and rhombus

(D) any two trapeziums

5. The volume of a sphere of radius *'r'* units is

(A) $\frac{2}{3}\pi r^3$ cubic units (B) $\frac{4}{3}\pi r^3$ cubic units

(C) $\frac{1}{3}\pi r^3$ cubic units (D) $\frac{3}{2}\pi r^3$ cubic units

6. The distance of a point $P(x, y)$ from the origin is

(A) $\sqrt{x^2 - y^2}$ (B) $\sqrt{x + y}$

(C) $\sqrt{x^2 + y^2}$ (D) $\sqrt{x - y}$

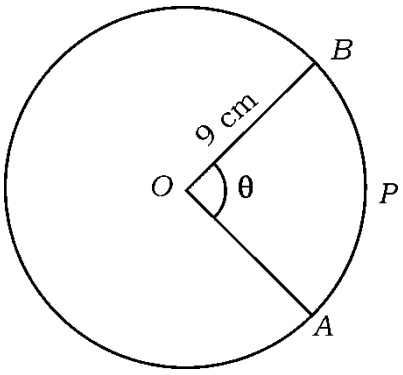
7. The common difference of the arithmetic progression

– 1, – 3, – 5 ... is

(A) – 1 (B) 2

(C) – 2 (D) 3

8. In the given figure *'O'* is the centre of the circle and the length of the arc *APB* is 4 π cm. If *OB* = 9 cm, then the measure of angle θ is



(A) 60° (B) 80°

(C) 85° (D) 70°

II. Answer the following questions : 8 × 1 = 8

9. Write the degree of a linear polynomial.

10. Write the formula to find the total surface area of a cube of edge *'a'* units.

11. In the given frequency distribution table, write the modal class :

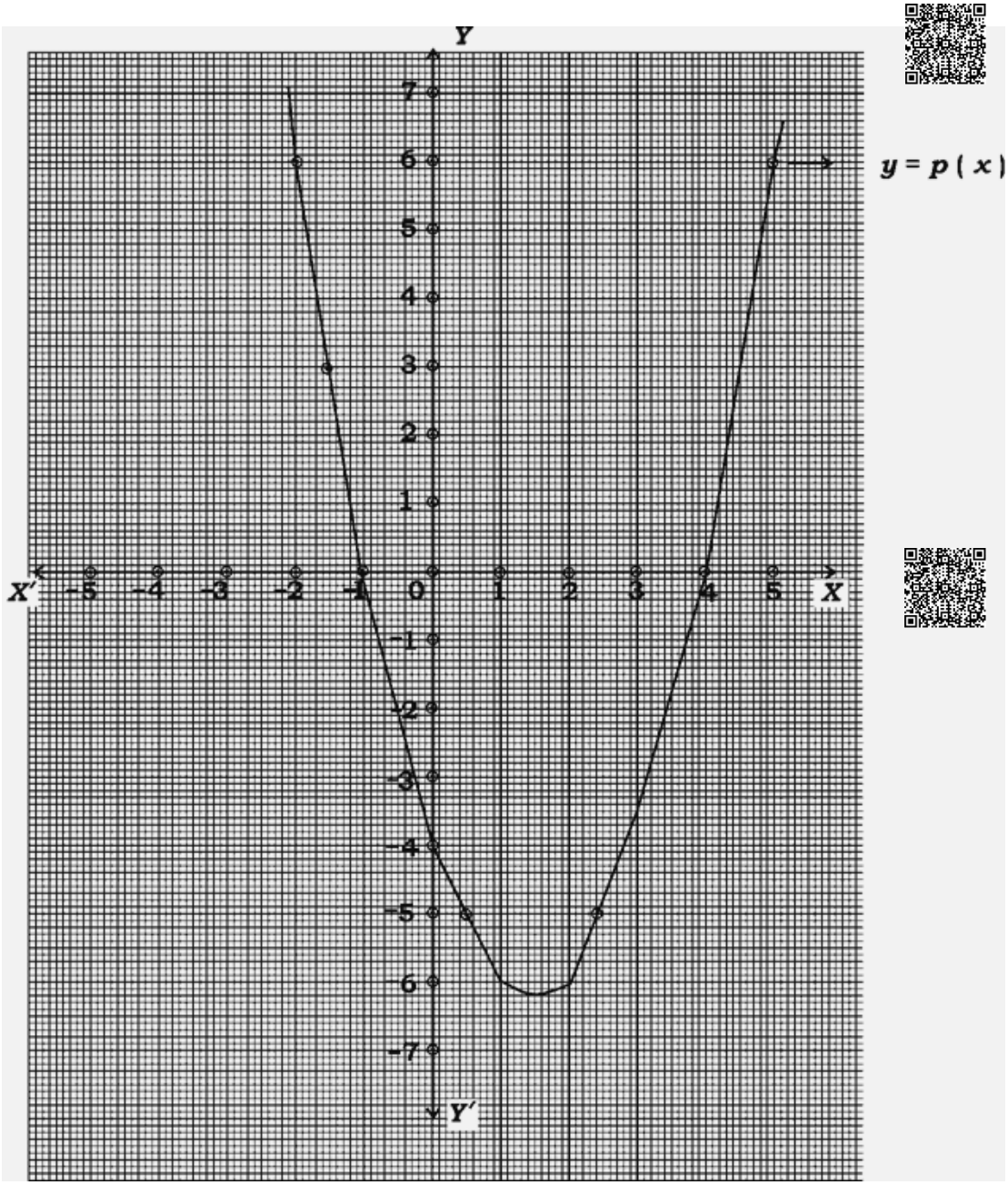
Class-interval	*Frequency*
1 – 3	4
3 – 5	8
5 – 7	2
7 – 9	2

12. Write the probability of an impossible event.

13. How many solutions do the pair of linear equations

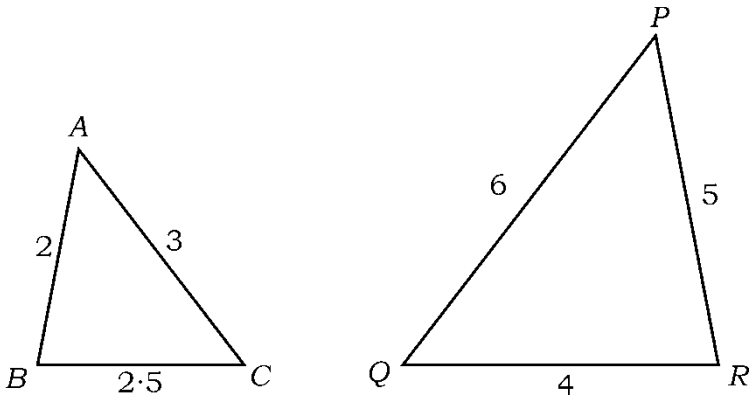
$2x + 3y - 9 = 0$ and $3x + 2y - 6 = 0$ has ?

14. Write the zeroes of the polynomial $y = p(x)$ in the given graph.



15. Write the roots of the quadratic equation $x(x + 2) = 0$.

16. In the given figure, write the similarity criterion used to show that $\Delta ABC \sim \Delta QRP$.

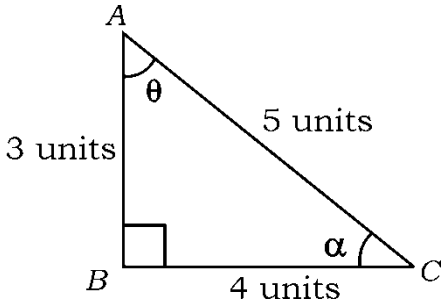


III. Answer the following questions : **8 × 2 = 16**

17. In the given figure, $\angle ABC = 90°$. Write the values of the following :

i) sin α

ii) tan θ



18. Prove that $6 + \sqrt{2}$ is an irrational number.

OR

The HCF and LCM of two positive integers are respectively 4 and 60. If one of the integers is 20, then find the other integer.

19. Solve the given pair of linear equations by elimination method :

$2x + y = 10$

$x - y = 2$

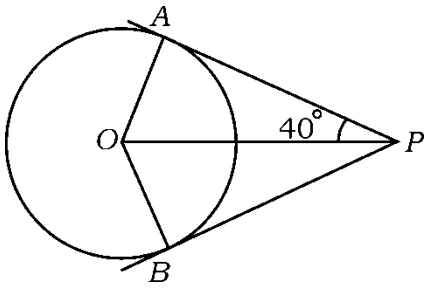
20. Find the roots of the quadratic equation $x^2 + 8x + 12 = 0$.

OR

Find the discriminant of the quadratic equation $x^2 + 4x + 5 = 0$ and hence write the nature of the roots.

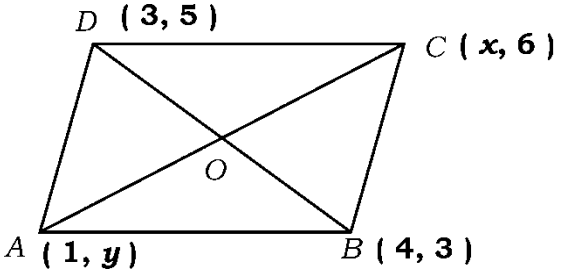
21. Find the sum of first 20 terms of the arithmetic progression 5, 9, 13, ... using formula.

22. In the given figure, *PA* and *PB* are tangents to the circle with centre *'O'*. If *PA* = 4 cm and $\angle APO = 40°$, then find the measure of $\angle AOB$ and length of *PB*.



23. According to Fundamental Theorem of Arithmetic, if $40 = x^y.z$, then find the values of *x, y* and *z*.

24. If *A* (1, *y*), *B* (4, 3), *C* (*x*, 6) and *D* (3, 5) are the vertices of a parallelogram taken in an order, then find the values of *x* and *y*.



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

25. Find the zeroes of the quadratic polynomial $p(x) = x^2 + 7x + 10$ and verify the relationship between the zeroes and the coefficients.

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

27. Prove that :

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2 \sec A.$$

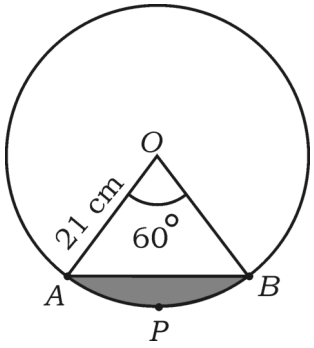
OR

Find the value of :

$$\left(\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ} \right)$$

28. In the given figure *'O'* is the centre of the circle of radius 21 cm. If $\angle AOB = 60°$, then find the area of the segment *APB*.

[Take $\sqrt{3} = 1{\cdot}73$]



29. Find the coordinates of a point which divides the line segment joining the points (– 1, 7) and (4, – 3) internally in the ratio 2 : 3.

OR

Find a relation between x and y such that the point (x, y) is equidistant from the points (3, 6) and (– 3, 4)

30. Find the mean for the following data :

Class-interval	*Frequency*
10 – 20	2
20 – 30	3
30 – 40	6
40 – 50	5
50 – 60	4

OR

Find the median for the following data :

Class-interval	*Frequency*
15 – 20	4
20 – 25	5
25 – 30	10
30 – 35	5
35 – 40	6

31. A box contains 20 cards numbered from 1 to 20. One card is drawn randomly from the box. Find the probability of getting a card bearing —

    i) a perfect square number

    ii) a number which is divisible by both 2 and 3.

32. The difference between the altitude and base of a right angled triangle is 5 cm. If the area of the triangle is 150 cm^2, then find the base and altitude of the triangle.

OR

The sum of the squares of two consecutive even positive integers is 164. Find the integers.

33. Two line segments *AB* and *CD* intersect each other at a point *'O'*. Join *AC* and *BD* such that *AC* || *BD* and prove that $\Delta AOC \sim \Delta BOD$.

V. Answer the following questions : **4 × 4 = 16**

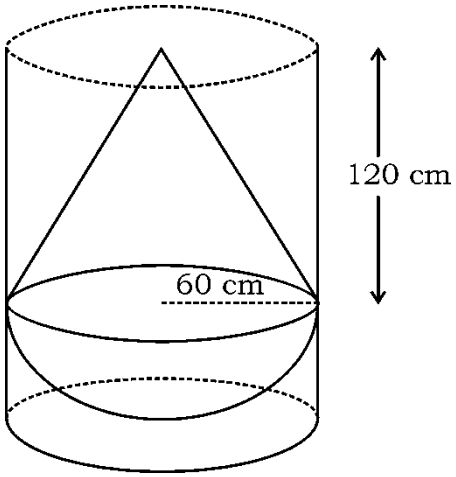
34. Find the solution of the given pair of linear equations by graphical method :

$x + 2y = 8$

$x + y = 5$

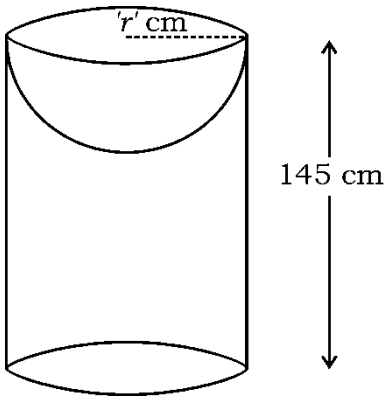
35. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio".

36. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom as shown in the figure. If the radius of the cylinder is 60 cm and height is 180 cm, then find the volume of water left in the cylinder in terms of π.



OR

A solid is made of a cylinder with a hemispherical depression having the same radius (*'r'* cm) as that of cylinder at the top end as shown in the figure. The volume of the hemispherical depression is 18000 π cm^3. If the height of the cylinder is 145 cm, then find the total surface area of the solid.



37. An arithmetic progression consists of 16 terms. The sum of all its terms is 768. If the last term of the progression is 93, then find the arithmetic progression. Also show that the sum of all the terms of this progression is equal to 3 times the sum of first 16 odd natural numbers using formula.

VI. Answer the following question : **1 × 5 = 5**

38. A pole and a tower are standing vertically on a level ground. The height of the pole is 6 m and the angle of elevation to the top of the pole from the bottom of the tower is 30°. The angle of elevation to the top of the tower from the top of the pole is 60° as shown in the figure. Find the height of the tower (*CD*). Also find the distance (*AC*) between the top of the pole and the top of the tower.