OFFICE OF DEPUTY DIRECTOR SCHOOL EDUCATION, KOLAR-DIST, KOLAR.

2023-24 S.S.L.C MODEL QUESTION PAPER SET-1

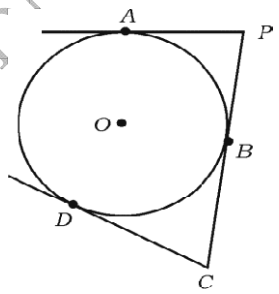
Time: 3hrs 15min **MATHEMATICS 81E** **Marks:-80**

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 alternatives and write the complete answer along with its letter of alphabet.*** **8x1=8**

1) A pair of linear equations $a_1x+b_1y+c_1= 0$, and $a_2x+b_2y+c_2 = 0$ are inconsistent then.

A) $\frac{a1}{a2} \neq \frac{b1}{b2}$ B) $\frac{a1}{a2} = \frac{b1}{b2} \neq \frac{c1}{c2}$ C) $\frac{a1}{a2} = \frac{b1}{b2} = \frac{c1}{c2}$ D) $\frac{a1}{a2} \neq \frac{c1}{c2}$

2) In the given figure PA, PC and CD are the tangents to a circle with centre O. If CD = 5 cm and AP = 3 cm, then length of the tangent PC is



A) 8 cm B) 5 cm C) 3 cm D) 2 cm

3) The co-ordinates of the mid-point of the line segment joining the points (4,3) and (-2,5) is

A) (3,4) B) (2,4) C) (1,4) D) (4,1)

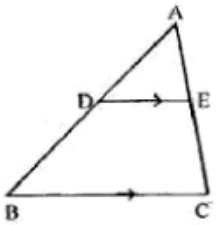
4) The value of discriminant of the quadratic equation $x^2 – 3x – 2=0$ is

A) -17 B) 1 C) – 1 D) 17

5) The formula to find length of an arc of a sector whose radius is 'r' and angle θ is

A) $\frac{\theta}{360}$X $2\pi r^2$ B) $\frac{\theta}{180}$X πr^2 C) $\frac{\theta}{360}$ X $2\pi r$ D) $\frac{\theta}{360}$X πr^2

6) In triangle ABC, DE||BC then $\frac{AD}{BD}$ =



A) $\frac{AE}{AC}$ B) $\frac{AD}{AB}$ C) $\frac{DE}{BC}$ D) $\frac{AE}{CE}$

7) If $\sin\theta = \frac{12}{13}$, then the value of $\operatorname{cosec}\theta$ is

A) $\frac{5}{12}$ B) $\frac{5}{13}$ C) $\frac{13}{12}$ D) $\frac{12}{13}$

8) In division of Integers a = bq + r if the remainder is zero then

A) q = $\frac{a}{b}$ B) q = $\frac{b}{a}$ C) r = $\frac{a}{b}$ D) a = $\frac{q}{b}$

II) Answer the following : **8x1=8**

9) Write 42 as the product of prime numbers.

10) What is the sum of probability of an event E and the probability of its complement event $\bar{E}$.

11) Write the statement of 'basic proportionality theorem'.

12) If 3, m, 11 are in Arithmetic progression, then find the value of **'m'**.

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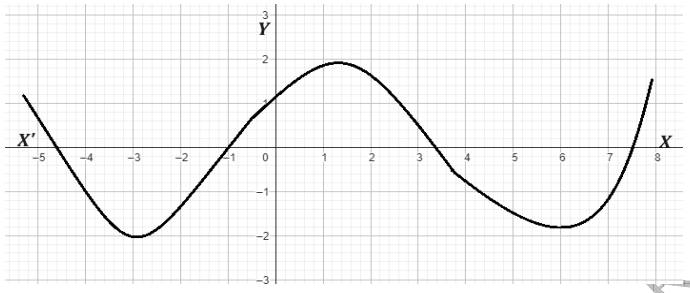
13) Write the standard form of quadratic equation with variable x.

14) In the graph given find the number of zeros of the polynomials.



15) Evaluate the value of $\frac{sin32^0}{cos58^0}$

16) Write the formula to calculate the Lateral surface area of cylinder.

III) Answer the following : **8x2=16**

17) Find the sum of first 30 terms of the given arithmetic progression 2 + 5 + 8 + - - - - - - - -

18) Find the solution for the pair of linear equations x + 2y = 7 and x – y = 1 by elimination method.

19) Prove that $\sqrt{7}$ + 2 is an irrational number.

20) Find the distance between points A(4 , 7) and B(- 4 , 1) 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

21) Construct a pair of tangents to the circle of radius 4 cm from an external point which is 9 cm away from the centre of the circle.

22) Solve the equation by using quadratic formula $2x^2 + 3x + 1 = 0$

OR

In the equation $x^2 - 2kx + 4 = 0$, if the value of discriminant is '0' then, find the value of 'k'

23) The unbiased die of cubical form, upon which numbers 1,2,3,4,5 and 6 are written on its each face. Find the probability of getting prime number when it is thrown once, on the floor.

24) Prove that $\frac{Sin60^0 .Cos30^0 - Sin30^0 .Cos60^0}{Cosec30^0 + Sec60^0} = \frac{1}{8}$

IV) Answer the following : **9x3=27**

25) Divide $p(x) = x^3 + 9x^2 + 18x + 20$ by $g(x) = x + 4$ & find the quotient q(x) and remainder r(x)

26) Construct a triangle of sides 5cm , 7cm and 8cm and then a triangle similar to it whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle.

27) Show that the points (-2 , 1) , (2 , 5) and (4, 7) are collinear.

28) Prove that the tangents drawn to the circle, from an external point are equal in length.

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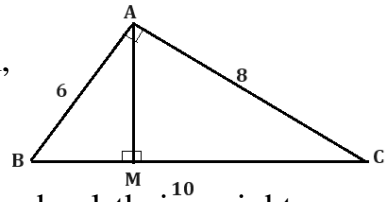
29) In the right angled triangle ΔABC, AM ⊥ BC given that AB = 6cm,

BC = 10cm and AC = 8cm. Find the length of BM and CM



30) During the medical check-up of 10th standard 50 students of a school their weights were recorded as follows. Draw a 'less than type' of Ogive for the data.

Weight (in kg)	**Number of students (cumulated)**
Less than 40	2
Less than 45	6
Less than 50	10
Less than 55	15
Less than 60	20
Less than 65	35
Less than 70	45
Less than 75	48
Less than 80	50

31) Find the mean of the following grouped data.

Class Interval	**Frequency**
0 – 4	1
5 – 9	4
10 – 14	8
15 – 19	6
20 – 29	1
Total	**20**

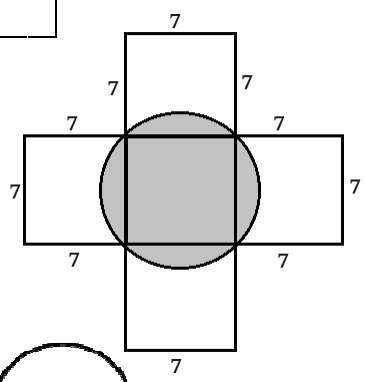
OR

Find the median for the given grouped data.

Class Interval	**Frequency**
0 – 10	3
10 – 20	5
20 – 30	9
30 – 40	5
40 – 50	3

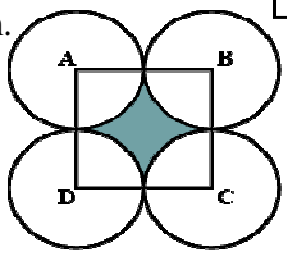
32) In the given figure if each side of a squares 7cm

Calculate shaded portion.



OR

In the given figure ABCD is square of each side 14cm. With centres as A,B,C and D four circles touches each other externally. Find the area of the shaded portion.



33) The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.

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OR

A train travels 360 kms in uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

V) Answer the following **4x4=16**

34) Prove that in a right angled triangle the square of the hypetenuse is equal to sum of the squares of the other two sides.

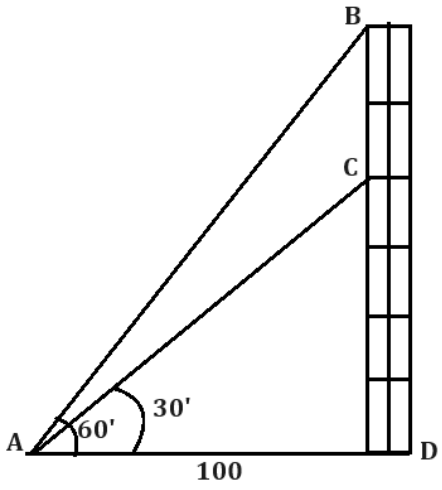
35) Solve the given pair of linear equations graphically $2x + y = 5$ and $x - y = 1$

36) In an arithmetic progression consisting 10 terms. Sum of middle two terms is 42 and the last term is 39 then, find the sum of the progression.

OR

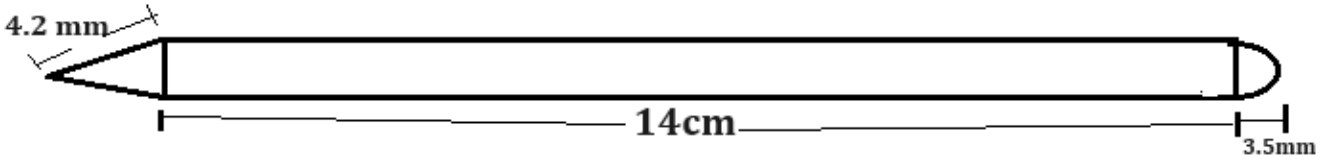
There are five terms in an arithmetic progression. The sum of these terms is 55, and the fourth term is five more than the sum of the first two terms. Find the terms of the progression.

37) A person A observes his friends on the tall building from a point he is standing. One of his friend B was at the top of the building, when observed the angle of elevation was 60^0. Another friend C who is standing some floors below was observed at an angle of elevation 30^0. If the observing person is at 100 m from the building then, find the height of the building, and the distance between B and C the friends who were standing on different floors of the building.



VI) Answer the following question **5x1=5**

38) The cylindrical shaped pencil whose front part looks like cone and the back looks like hemisphere. The radius of the cylinder shape is 3.5 mm, and its length is 14 cm. The slant height if a cone shape is 4.2 mm, find the total surface area of the pencil.



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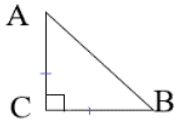
2023-24 S.S.L.C MODEL QUESTION PAPER SET-2

Time: 3hrs 15min **MATHEMATICS 81E** **Marks:-80**

I. Four alternatives are given for each of the following incomplete statement or question. Choose the correct alternative and write the complete answer along with its letter of alphabet. **1 ×8 = 8**

1. Square root of a prime number is always
   A) Rational B) Irrational C) Prime D) Integers
2. In an A.P. first term is 2 and Arithmetic Mean is 4, the third term is
   A) 24 (B) 10 (C) 2 (D) -2
3. Related to pair of linear equations in two variables, which among the following statement is wrong
   A) Graph is a straight-line B) Coefficients are non-zero real numbers
   C) Every point on line is a solution D) $a^2 + b^2 = 0$
4. Example for linear polynomial is
   A) $p(x)=x^3 - 3x +3x +3$ B) $p(x) = 9x^2 +13$
   C) $p(x)= 3x - 12$ D) $p(x) = x^4 - 3x^2 +3x +3$
5. Nature of roots of Pure Quadratic equation is
   A) Real and equal B) Real and distinct
   C) Complex numbers D) Both A) and B)
6. In adjoining fig angle of elevation of AB with BC is
   A) 30^o B) 45^o C) 60^o D) 90^o



7. If Area of a circle is twice of its perimeter, then its radius is
   A) 4units B) 2πunits C) 2units D) 6units
8. If lateral surface area of a hemisphere is $77cm^2$, then its radius is
   A) 7cm B) $\frac{7}{2}$cm C) $7cm^2$ D) $\frac{7}{2}cm^2$

II. Answer the following questions. **1 x 8 = 8**

9. What is the condition for similarity of triangle?
10. If the graph representing a pair of linear equations coincides, write ratio of their co-efficient?
11. Write the fundamental theorem of Arithmetic.
12. Write the sum and product of the zeros of the polynomial $P(x) = ax^2 + bx + c$.
13. What is $(\tan 90^o - \theta)$?
14. If $\sin^2\theta + \cos^2\theta = 1$,then what is $\cos\theta$?
15. What is the probability of a sure event?
16. Write the formula used to find the volume of a frustum of cone.

III. Answer the following questions. **2 x 8 = 16**

17. Prove that $\sqrt{3}+6$ is an irrational number.

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18. Find the 25th term ofArithmetic progression 1,4, 7, 10, ...using the formula.

OR

Find the sum of first 20 terms of the Arithmetic progression 5+8+11+……

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

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

20. Solve the equation $2x^2 + x - 6 = 0$ using quadratic formula.

OR

Discuss the nature of roots of the quadratic equation $2x^2 - 5x + 1 = 0$.

21. Prove that $\frac{1+\tan^2 A}{1+\cot^2 A} = \tan^2 A$

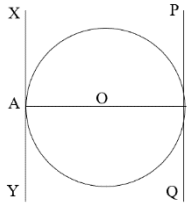
22. Find the midpoint of line joining A(2,3) and B(4,7)

23. Construct a pair of tangents to a circle if radius 4cm which are inclined to each other at an angle 60^0

24. A dice is thrown once. Find the probability of getting i) prime number ii) even number?

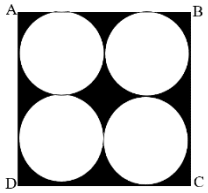
IV. Answer the following questions. **3 x 9 = 27**

25. In adjoining circle, AB is diameter. Prove that PQ ‖RS



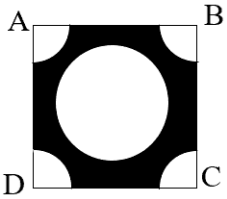
26. Prove that, "the length of tangents drawn from an external point to a circle is equal".

27. In adjoining fig in a square of side 4cm,a quadrant of radius 1cm and a circle of radius 2cm is cut off, find the area of remaining portion of square.



OR

Find the area of shaded region of adjoining square ABCD of side 14cm.



28. Construct a triangle with sides 6cm, 7cm and 8cm. Then construct another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.

29. Find the coordinates of the point which divide the line segment joining the points A(4,-3) and B(8,5)in the ratio 3:1

OR

If P(5,-3) and Q(3,y) are the points of trisection of the line segment joining A(7,-2) and B(1,-5).then find the value of y

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

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31. The difference of square of two integers is 180, if the square of the smallest integers is 8 times the larger number, find the numbers.

OR

If a cyclist had gone 3kms/hr faster, he would have taken 1 hr and 20min less to ride 80 kms. What time did he take?

32. Find the mean for the following frequency distribution table.

Class Interval	Frequency(f_i)
1-5	4
5-9	3
9-13	5
13-17	7
17-21	1
	$\sum f_i = 20$

OR

Calculate the mode for the following frequency distribution table.

Class interval	Frequency
0 – 10	7
10 – 20	10
20 – 30	15
30 – 40	8
40 – 50	10

33. During a medical survey the heights the weights of students of a class is given below. Draw "more than type" Ogive for this data.

more than or equal to 50	100
more than or equal to 55	98
more than or equal to 60	90
more than or equal to 65	78
more than or equal to 70	54
more than or equal to 75	16

V. Answer the following questions. **4 x 4 = 16**

34. The 17^{th} term of an A.P is 5 more than twice its 8^{th}term.if its 11^{th}term is 43,find the n^{th} term and A.P

35. Find the solution of the linear equations $2x + y = 6$

and $4x – 2y = 4$ by graphical method.

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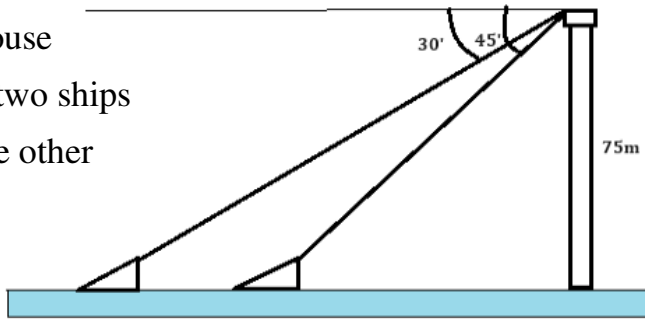
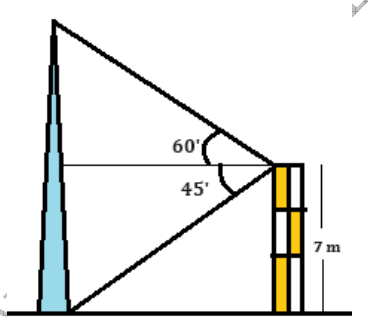
36. As observed from the top of 75m high light house from the sea level, the angles of depression of two ships are 30^o and 45^o.if one ship is exactly behind the other on the same side of the light house, find the distance of the two ships.

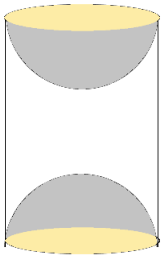


OR

From the top of 7m high building the angle of elevation of cable tower is 60^0 and angle of depression of its foot is 45^0.
Determine the height of the tower.



37. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If height of cylinder is 10cm and its base is 3.5cm.find out the total surface area of the article



VI. Answer the following question. **5 x 1 = 5**

38. State and prove Pythagoras theorem.

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2023-24 S.S.L.C MODEL QUESTION PAPER SET-3

Time: 3hrs 15min **MATHEMATICS 81E** **Marks:-80**

I) Four alternatives are given for each of the following incomplete statement or question. Choose the correct alternative and write the complete answer along with its letter of alphabet. **1 x 8 = 8**

1) A pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is said to be inconsistent if

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

2) If the n^{th} term of an Arithmetic progression is $4n - 2$ then 5^{th} term is

(A) 5 (B) 20 (C) 22 (D) 18

3) The number of tangents that can be drawn to a point on the circumference of a circle is

(A) 1 (B) 2 (C) 0 (D) Infinite

4) A rational number among these is

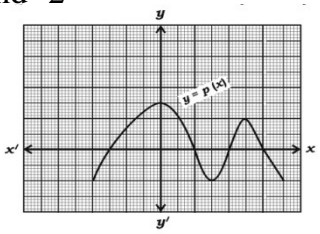
(A) $3 + \sqrt{9}$ (B) $\sqrt{36}$ (C) $\sqrt{3}$ (D) $\sqrt{4}$

5) The roots of the equation $x^2 - 4 = 0$ are

(A) 0 (B) 4 and - 4 (C) $\sqrt{2}$ and $-\sqrt{2}$ (D) 2 and -2

6)The value of $\sin 60^0$ is

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



7) In the given graph, the number of zeros of a polynomial p(x) are

(A) 1 (B) 3 (C) 4 (D) 2

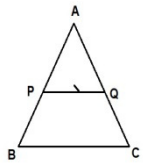
8) A right circular cylinder and a cone have the same radius and height. If the volume of cylinder is $240cm^3$, then the volume of the cone is

(A) $60cm^3$ (B) $80cm^3$ (C) $120cm^3$ (D) $180cm^3$

II) Answer the following questions. **1 x 8 = 8**

9) State Pythagorous theorem.

10) What is the probability of an impossible event?



11) Write the degree of the polynomial $4x^2 - 5x^3 + 2x + 10$.

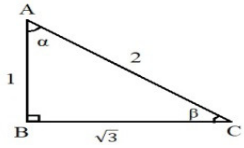
12) In $\triangle ABC$, if $PQ \parallel BC$ then write the ratio equal to $\frac{AQ}{QC}$.

13) The HCF and LCM of two numbers are 2 and 48. If one of the two numbers is 6 then find the other number.

14) Find the length of the semi circle if its radius is 7cm.

15) Write the formula used to find volume of the Cone with height 'h'units and base radius 'r'units

16) In the given figure, find the value of tan α.



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III) Answer the following questions. **2 x 8 = 16**

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

18) Find the 30^{th} term of the Arithmetic progression 3, 7, 11, ... using formula.

OR

The 4^{th} term of an Arithmetic progression is 22. If the common difference is 3 then find the first term.

19) Solve the given pair of linear equations by Elimination method:

$x + 2y = 8$

$x + y = 6$

20) Solve the equation $x^2 - 6x + 5 = 0$ using quadratic formula.

OR

Find the discriminant of the equation $x^2 + 2x + 3 = 0$ and hence write the nature of its roots.

21) A cubical die whose faces are numbered from 1 to 6 is rolled once. Find the probability of getting a number greater than 2 on its top face.

22) Find the area of triangle ABC whose vertices are A(2, 3) , B(0, 2) and C(2, 1).

23) Draw a pair of tangents to the circle of radius 3.5cm which are inclined to each other at an angle of 120^0.

24) A vertical pole of height 12m casts a shadow of length 8m on the plane ground. At the same time if a tower casts a shadow of length 40m on the plane ground then find the height of the tower.

IV) Answer the following questions. **3 x 9 = 27**

25) Divide the polynomial $p(x) = x^3 - 6x^2 + 11x - 6$ by the polynomial $g(x) = x^2 - 3x + 2$ and find the quotient q(x) and remainder r(x).

26) The speed of a boat in still water is 15 km/h. It can go 30km upstream and return downstream to the orginal point in 4 hours 30 minutes. Find the speed of the stream.

OR

The sum of the squares of two positive integers is 208. If the square of the larger number is 18 times the smaller number then find the numbers.

27) Find the co ordinates of the point which divides the line segment joining (-5, 5) and (7, 5) internally in the ratio 3: 1. **OR**

Find the ratio in which the line segment joining (-2, -3) and (5, 6) is divided by x- axis.

28) Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

OR

Prove that $(\text{cosec}\,\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta) = 1$

29) Find the mean for the following frequency distribution table.

Class Interval	Frequency(f_i)
5 – 15	4
15 – 25	5
25 – 35	8
35 – 45	2
45 – 55	1
	$\sum f_i = 25$

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OR

Calculate the mode for the following frequency distribution table.

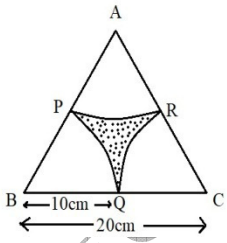
Class interval	Frequency
10 – 20	3
20 – 30	5
30 – 40	8
40 – 50	3
50 – 60	1

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

31) Construct a triangle with sides 6cm, 7cm and 8cm. Then construct another triangle whose sides are $\frac{3}{2}$ of the corresponding sides of the first triangle.

32) ABC is an equilateral triangle of side 20cm. A, B and C are the centers of circular arcs PQ, QR and RP of radius 10cm. Find the area of the shaded region.

(Take $\pi = 3.14$ and $\sqrt{3} = 1.73$)



33) During a world cup cricket tournament, the runs scored by 60 batsmen were recorded as follows. Draw "more than type" Ogive for this data.

Runs	Number of Batsmen (Cummulative frequency)
more than 50	60
more than 60	55
more than 70	35
more than 80	25
more than 90	10
more than 100	05

VII. Answer the following questions. **4 x 4 = 16**

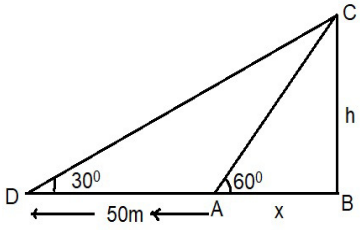
34) Find the solution of the following pair of linear equations by graphical method.

$x + 2y = 8$

$x + y = 5$

35) A person standing on the bank of a river, observes that the angle subtended by a tree on the opposite bank is 60^0. When he moves 50m away from the bank he finds that the angle of elevation to be 30^0.

Find the height(h) of the tree and the breadth(x) of the river.



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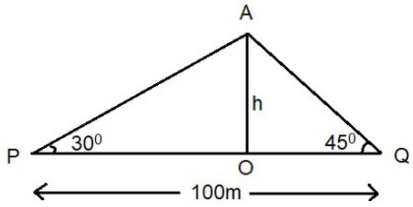
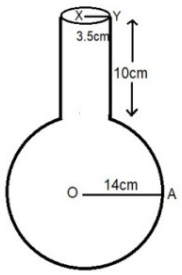
OR

There is a small island in the middle of a 100m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on two banks and in line with the tree. If the angle of elevation of the top of a tree from P and Q are 30^0 and 45^0 respectively. Find the height of the tree.



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

37) A student found a round bottom flask in a Chemistry lab and measures the dimension of it. The radius of the spherical bottom is 14cm, the height and radius of cylindrical part is 10cm and 3.5cm respectively. Find the surface area and volume of that round bottom flask.



VIII. Answer the following question. **5 x 1 = 5**

38) In winter, the temperatures at a hill station from Monday to Friday are in an Arithmetic progression. The sum of the temperatures of Monday, Tuesday and Wednesday is zero and the sum of the temperatures of Thursday and Friday is 15^0.

Find the temperature of each of the 5 days.

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2023-24 S.S.L.C MODEL QUESTION PAPER SET-4

Time: 3hrs 15min **MATHEMATICS 81E** **Marks:-80**

I) Four alternatives are given for each of the following incomplete statement or question. Choose the correct alternative and write the complete answer along with its letter of alphabet. **1 x 8 = 8**

1 The HCF of 21 and 17 is

A)1 B) 17 C) 21 D) 357

2 The 21st term of the Arithmetic progression 5, 9, 13. …… is

A) 29 B) 85 C) 100 D) 420

3. The degree of the polynomial $p(x) = 2x^4 - 3x + 7$ is

A) 2 B) 3 C) 4 D) 7

4. The standard form of the equation $x^2 = 12x - 7$ is

A) $x^2 - 12x - 7$ B) $x^2 - 12x = 7$ C) $x^2 - 12x - 7 = 0$ D) $x^2 - 12x + 7 = 0$

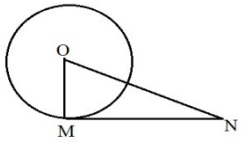
5. The value of $\sin 90^0$ is

A) 0 B) $\frac{1}{2}$ C) $\frac{1}{\sqrt{2}}$ D) 1

6. On simplifying, $\cos(90^0 - \theta)$ X cosec θ we get

A) $cosec^2\theta$ B) $sin\theta$ C) 1 D) 0

7. In the given figure 'O' is the centre of the circle, MN is the tangent.



If $\angle ONM = 30^0$, then the measure of $\angle MON$ is

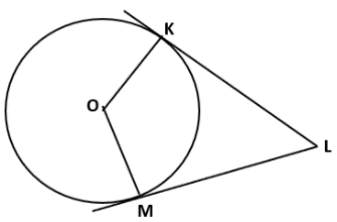
A) 30^0 B) 60^0 C) 70^0 D) 80^0

8. If the area of one of the quadrant of the circle is $154cm^2$, then the area of the circle is

A) $616cm^2$ B) $628cm^2$ C) $862cm^2$ D) $910cm^2$

II) Answer the following questions. **1 x 8 = 8**

9. Write the statement of Euclid's division lemma.
10. How many solutions do the pair of linear equations has, if the lines represented by them are parallel?
11. The probability of winning a game is 0.72. Write the probability of losing the same game.
12. If the ratio of the areas of two similar triangles is 100: 121, then find the ratio of their corresponding sides.
13. Write the sum of the zeros of the polynomial $p(x) = x^2 - 3x + 14$
14. The discriminant of a quadratic equation is 0 (zero). Write the nature of its roots.
15. In the figure 'O' is the centre of the circle. KL and KM are the tangents. Write the sum of the measures of $\angle KOM$ and $\angle KLM$ is



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16. Write the formula used to find the total surface area of a Hemisphere of radius 'r' units.

III) Answer the following questions. **2 x 8 = 16**

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

18. In an Arithmetic progression consisting of 20 terms, if the first term is 3 and last term is 79, then find the sum of all the terms of the given progression using formula.

OR

Find the sum of first 20 terms of the Arithmetic progression 5, 8, 11, . . . using formula.

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

$2x + 3y = 10$

$x + 3y = 8$

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

OR

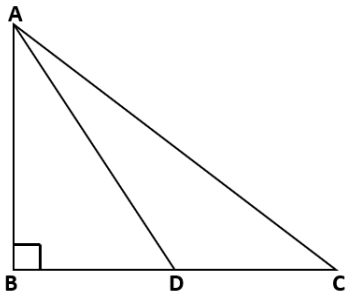
Solve the equation $x^2 + 4x = 7$ by completing the square method.

21. Two identical coins are tossed simultaneously. Find the probability of getting atleast one tail.

22. Find the distance of between the points R(7,5) and M(9,6) using distance formula.

23. Draw a circle of radius 4cm and construct two tangents to it such that the angle between the tangents is 60^0

24. In the given figure ABC is a right-angled triangle. If $\angle B = 90^0$ and D is the midpoint of BC, then prove that $AC^2 = (4AD^2 - 3AB^2)$



IV) Answer the following questions. **3 x 9 = 27**

25. Divide the polynomial $p(x) = 5x^3 + 7x^2 + 3x + 8$ by the polynomial $g(x) = x^2 + x + 1$ and find the quotient q(x) and remainder r(x).

26. A two-digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

OR

The diagonal of a rectangular field is 16 m more than the shorter side. If the longer side is 14 m more than the shorter side then find the length of the sides of the field.

27. Find the ratio in which the line segment joining the points A (8, 2) and B (-6, 9) is divided by the point P (2, 5).

OR

Find the value of P for which the points (3, p), (4, 2), (5, 3) are collinear.

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28. Prove that (1 + cot θ – cosec θ) (1 + tan θ+ sec θ) = 2

OR

Prove that $\frac{\sin\theta}{1+cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\ \text{cosec}\theta$

29. Find the mean for the following frequency distribution table.

Class Interval	Frequency(f_i)
10 – 20	4
20 – 30	6
30 – 40	3
40 – 50	2
50 – 60	5
	$\sum f_i = 20$

OR

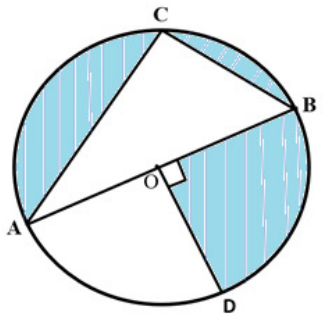
Calculate the median for the following frequency distribution table.

Class interval	Frequency
50 – 60	8
60 – 70	7
70 – 80	12
80 – 90	6
90 – 100	7

30. Prove that, "the length of tangents drawn from an external point to a circle are equal".

31. Construct a triangle with sides 6cm, 7.5cm and 9cm. Then construct another triangle whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

32. In the figure O is the centre of the circle with AC=24 cm, BC=7 cm and $\angle BOD = 90^0$. Find the area of the shaded region. (Take $\pi = 3.14$)



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33. During a medical survey the weights of 80students of a class were recorded as follows. Draw "less than type" Ogive for this data.

weight (in kg)	Number of Students
Less than 40	10
Less than 45	22
Less than 50	30
Less than 55	45
Less than 60	60
Less than 65	80

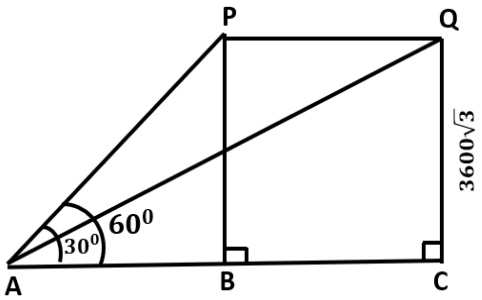
V) Answer the following questions. **4 x 4 = 16**

34. In an arithmetic progression with positive common difference, the sum of the third and seventh terms is 6 and their product is 8. Find the sum of the first sixteen terms of this arithmetic progression.

OR

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

35. The angle of elevation of a jet plane from a point A on the ground is 60^0. After a flight of 30 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}$metres, find the speed of the jet plane.



36. Prove that "If in two triangles, the corresponding angles are equal, then their corresponding sides are proportional and hence the triangles are similar."

37. Find the solution of the following pair of linear equations by graphical method.

$x + y = 5$

$2x + y = 8$

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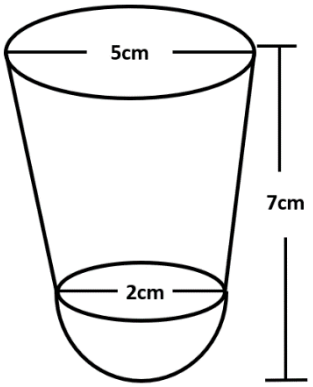
VII) Answer the following question. **5 x 1 = 5**

38. A solid is in the shape of a frustum of a cone mounted on a hemisphere. The external diameters of the frustum of a cone are 5cm and 2cm. If the height of the entire solid is 7cm, then find its external surface area.



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2023-24 S.S.L.C MODEL QUESTION PAPER SET-5

Time: 3hrs 15min **MATHEMATICS 81E** **Marks:-80**

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

1.The rational number having a non-terminating and repeating decimal expansion in the following is

A) $\frac{1}{2^5}$ B) $\frac{11}{5X\ 3^2}$ C) $\frac{13}{5^2X\ 2^3}$ D) $\frac{1}{5^7}$

2. If the n^{th} term of an arithmetic progression a_n=32-4n, then its 8^{th} term is

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

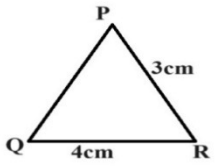
3. The quadratic equation among the following is

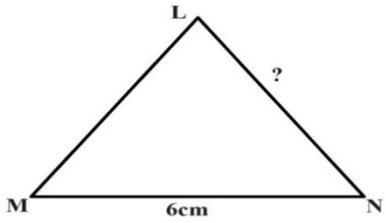
A) $x^2 - 3x = x^2 + 5x - 7$ B) $x^2 - 3x = x^2 + 5x + 7$

C) $x + 8 = x^2$ D) $x - \frac{3}{x} = x^2$

4. In the figure ΔPQR ~ΔLMN, If QR=4cm, PR=3cm & MN=6cm, then the measure of LN is

A) 6cm B) 8cm C) 4.5cm D) 6.5cm

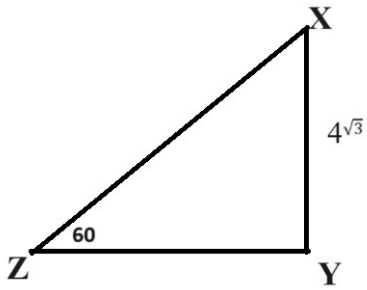




5. In the figure XYZ is a triangle in which $\angle Y = 90^0$, XY=$4\sqrt{3}$cm and $\angle Z = 60^0$ then the length of XZ is

A) $8\sqrt{3}$cm B) 8 cm

C) $2\sqrt{3}$ cm D) 4 cm



6.The angle of elevation of the top of a tower from a point on the ground, which is 30 meters away from the foot of the tower is 60^0. Then the height if the tower is

A) 10m B) 30m C) $10\sqrt{3}$m D) $30\sqrt{3}$m

7. If P(A) =$\frac{1}{3}$, then P ($\overline{A}$) is

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

8.If the Curved Surface Area of hemisphere is 308cm^2, the surface area of sphere is

A) 616sq.cm B) 154sq.cm C) 1,232sq.cm D) 108sq.cm

II. Answer the following questions **1 X 8 =8**

9. What is the HCF of any two prime numbers?

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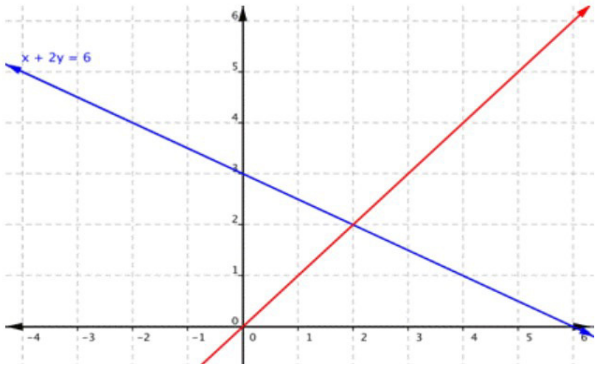
10. If $x, 19, 26$ are in arithmetic progression then write the value of x.

11. The given graph represents a pair of linear equations in two variables. Write how many solutions these pair of equations have.

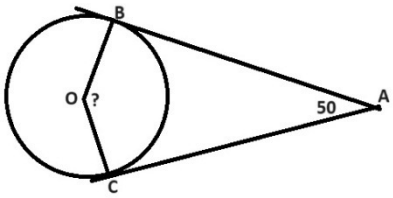


12) P(x) = $2x^4-5x^3+7$, then find the value of p (1).

13. Write the discriminant of the quadratic equation $ax^2+bx+c=0$

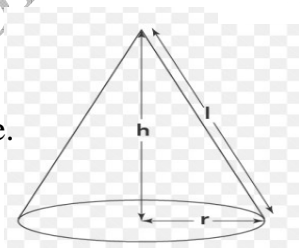
14. In the given figure O is centre of the circle A is external point such that AB & AC are tangents,

If $\angle BAC = 50^0$ then the find value of $\angle BOC$.



15. Find the value of cos 0^0 + sec 0^0.

16.Write the formula to find total surface area of the Cone.



III. Answer the following questions **2 X 8 =16**

17. Prove that $5-\sqrt{2}$ is an irrational number.

18.Find the sum of first 30terms of the arithmetic progression 5 + 8+ 11+…...using formula.

OR

Verify whether 30 is a term of the arithmetic progression 100, 93, 86…...

19. Solve the linear equations by elimination method $10x + 3y = 44$ and $10x - 5y = -20$

20. Write $\frac{x+1}{2} = \frac{1}{x}$, in the standard form of a quadratic equation and find the roots of the equation.

OR

Find the roots of the equation $6x^2+7x-10=0$ by using quadratic formula.

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

22. A lot of 45 shirts contain 7 defective ones one shirt is drawn at random from the lot. What is the probability that this shirt is not defective.

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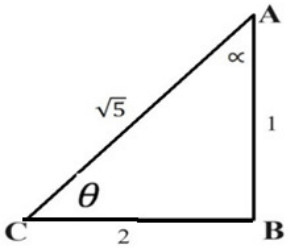
23.Find the co-ordinates of the point which divides the line segment joining points $(-1,7)$ & $(4,-3)$ in the ratio 2:3.

24. From the given figure find the value

a) $\cos\theta$ b) $\cot\propto$



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

25. Find the mean of the following distribution

Class Interval	0−10	10−20	20−30	30−40	40−50
Frequency	3	5	9	5	3

OR

Find the Median of the following data

Class Interval	Number of workers
1−5	7
5−9	2
9−13	2
13−17	8
17−21	1

26. In a certain examination of 100 workers, 53 students score the marks which is as shown in the following table, Draw a less than type ogive for the given data.

Marks obtained	Number of students
Less than 10	5
Less than 20	8
Less than 30	12
Less than 40	15
Less than 50	18
Less than 60	22
Less than 70	29
Less than 80	38
Less than 90	45
Less than 100	53

27. Show that the triangle whose vertices are A $(8,-4)$,B (5,5) and C (0,4) is an isosceles triangle.

OR

The points A, B and C are collinear, If A (1,0),B (4,4) and AC=8cm, then find the co ordinates of point C.

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28. A two-digit number is such that the product of the digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the numbers.

29. If 3 and -3 are two zeroes of the polynomial $P(x)=x^4+x^3-11x^2-9x+18$, then find the remaining two zeroes of the polynomial.

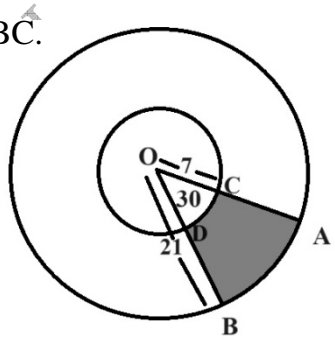
OR

Divide $P(x)=x^3-3x^2+5x-3$ by $g(x)=x^2-x+1$ then find the quotient q(x) and remainder r(x).

30. Prove that "The tangents at any point of a circle are perpendicular to the radius through the point of contact".

31.Construct a triangle ABC with sides BC=6cm, AB=4.5cm and AC=9cm. then construct a triangle whose sides are $\frac{2}{3}$ of the corresponding sides of the triangle of ABC.

32. AB and CD are the arcs of two concentric circles with centres O of radius 21cm and 7cm respectively. If $\angle AOB=30^0$ as shown in the figure, find the area of shaded region.

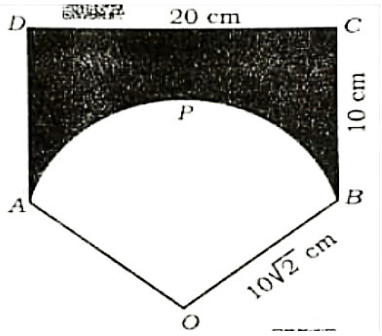


OR

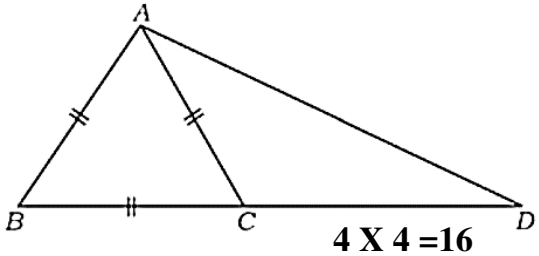
ABCD is rectangle of length 20cm and breadth 10cm.

OAPB is a Sector of a circle of radius $10\sqrt{2}$cm,

Calculate the area of the shaded region (Take $\pi=3.14$).



33. IN the ΔABD, C is a point on BD such that BC:CD=1:2, and ΔABC is a equilateral triangle. Then prove that $AD^2 = 7AC^2$



V. Answer the following questions **4 X 4 =16**

34. The last term of an arithmetic progression consisting of 10 terms is 46. If the sum of the 2 middles terms of the progression is 56 then find the arithmetic progression and also the sum of the terms of the arithmetic progression.

OR

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Sum of the first 6 terms is 42 and ratio of tenth and thirtieth term is 1:3, Find the first term and common difference of the arithmetic progression.

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

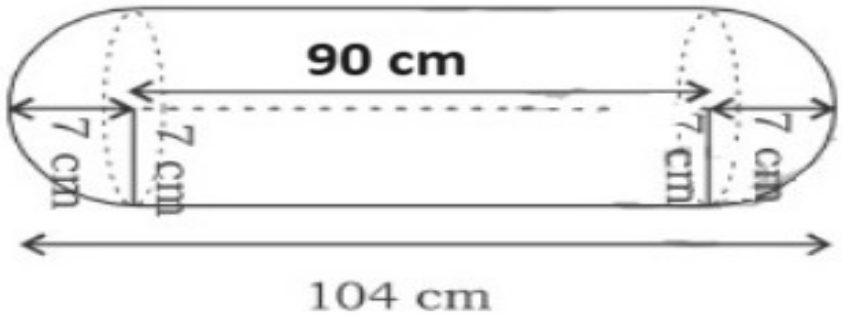
36. Find the solutions of the given pair of linear equations by graphical method $2x + y = 8$

$x + y = 5$

37. Two men are on opposite sides of the building they measure the angle of elevation of the top of the building as 30^0 and 60^0respectively if the height of the building is $50\sqrt{3}$metres find the distance between the 2 men.

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

38. A solid is composed of a cylinder with hemispherical ends.The whole length of the solid is 104 centimetre and radius of the hemispherical end is 7 centimetre find the cost of polishing the surface at the rate of ₹4 per 100 cm^2.



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