

Sl. No.

SSLC MODEL EXAMINATION, MARCH - 2021

MATHEMATICS

(English)

Time : 2½ Hours

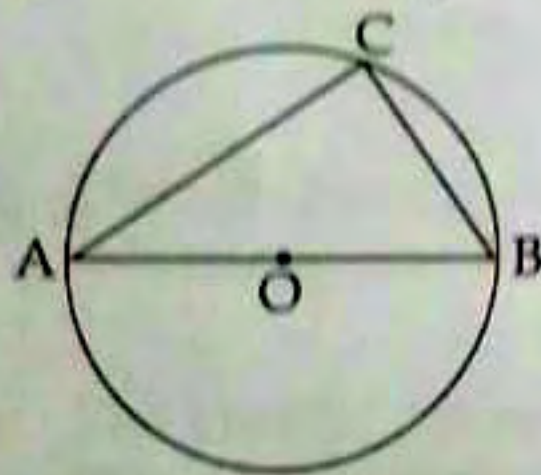
Total Score : 80

Instructions :

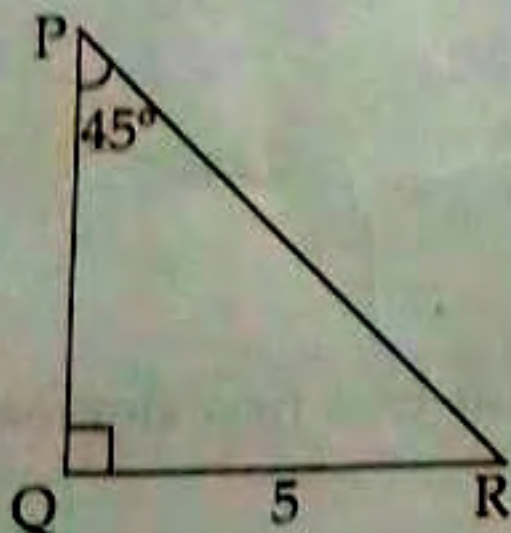
- 20 minutes is given as cool-off time.
- Use cool-off time to read the questions and plan your answers.
- Attempt the questions according to the instructions.
- Keep in mind, the score and time while answering the questions.
- The maximum score for questions from 1 to 45 will be 80.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc. using approximations unless you are asked to do so.

(Questions from 1 to 5, choose the correct answer from the brackets. Each carries 1 score.)

- | | Score |
|--|------------|
| 1. What is the common difference of the arithmetic sequence 4, 10, 16, ... ?
[4, 5, 6, 10] | 5x1=5
1 |
| 2. In the figure O is the centre of the circle. Write the measure of $\angle ACB$.
[30°, 60°, 90°, 100°] | 1 |



- | | |
|---|---|
| 3. In triangle PQR, $\angle Q = 90^\circ$, $\angle P = 45^\circ$, $QR = 5$ centimetres. What is the length of PR ?
[$10\sqrt{2}$, $5\sqrt{2}$, 10, $\frac{5}{\sqrt{2}}$] | 1 |
|---|---|



P.T.O.

4. Which of the following is a point on the x -axis ?

$[(3, 0), (0, 3), (-3, 2), (0, -2)]$

5. Which of the following is the midpoint of the line joining $(6, 2)$ and $(12, 2)$?

$[(8, 2), (10, 2), (2, 8), (9, 2)]$

(Questions from 6 to 10 carries 2 scores each.)

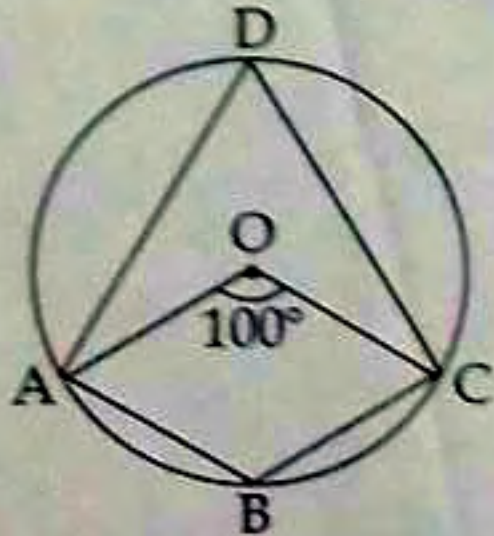
5x2=10

6. Algebraic form of an arithmetic sequence is $3n + 2$.

(a) What is its first term ?

(b) Find its 10th term.

7. A, B, C and D are points on the circle with centre O. $\angle AOC = 100^\circ$.



(a) What is the measure of $\angle ADC$?

(b) Find $\angle ABC$.

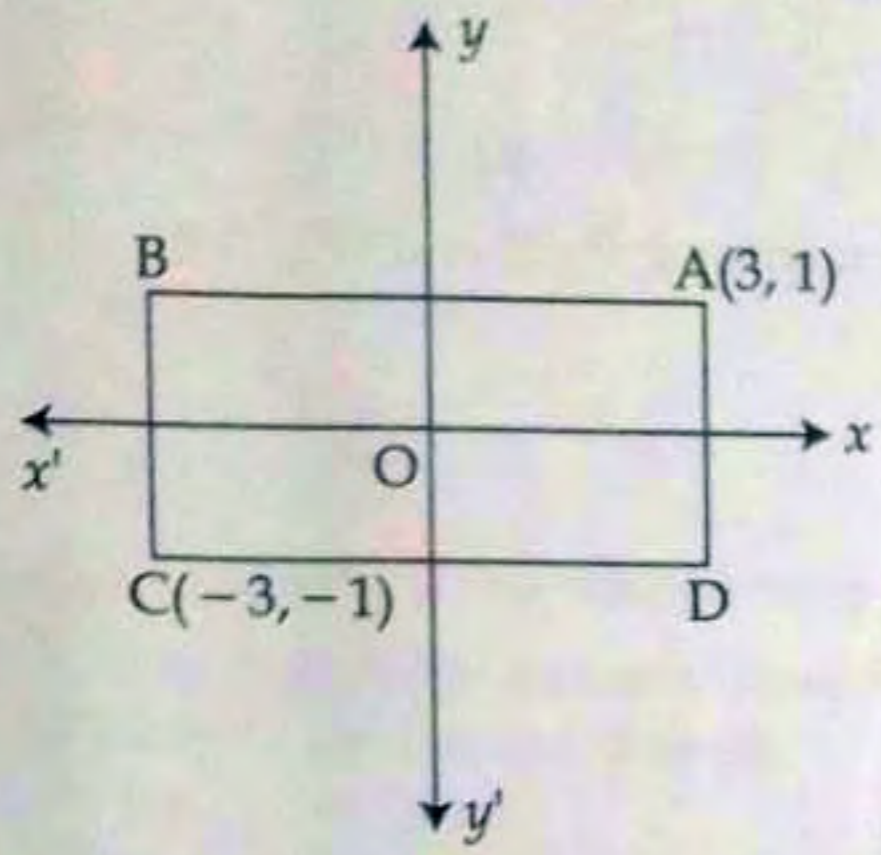
8. One is asked to say a natural number from 1 to 20.

(a) What is the probability of it being an even number ?

(b) What is the probability of it being a multiple of 5 ?

9. Write the second degree polynomial $x^2 - 16$ as the product of two first degree polynomials.

10. In the figure, the sides of the rectangle ABCD are parallel to the axes. Two of its vertices are A(3, 1) and C(-3, -1). Write the coordinates of B and D.



(Questions from 11 to 20 carries 3 scores each.)

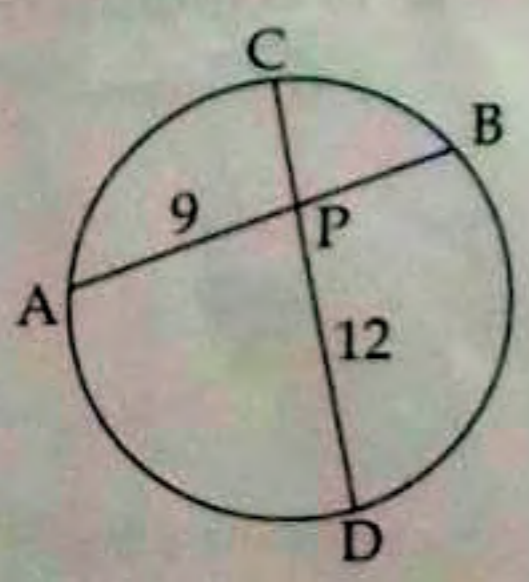
10x3=30

11. The 5th term of an arithmetic sequence is 20 and the 8th term is 32.
 (a) What is the common difference of this sequence? 1
 (b) Find its 11th term. 2

12. x is a natural number.
 (a) What number should be added to $x^2 + 2x$ to get a perfect square? 1
 (b) If $x^2 + 2x = 15$. Find the natural number represented by x . 2

13. The vertices of a triangle are points on a circle of radius 3 centimetres. If two angles of this triangle are 50° and 60° , draw the triangle. 3

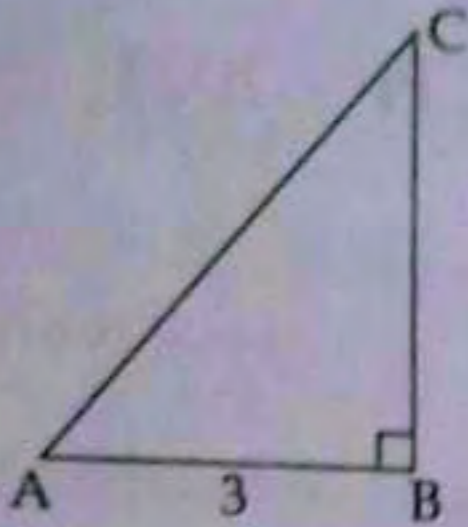
14. The chords AB and CD intersect at P. AB = 17 centimetres, PA = 9 centimetres, PD = 12 centimetres.



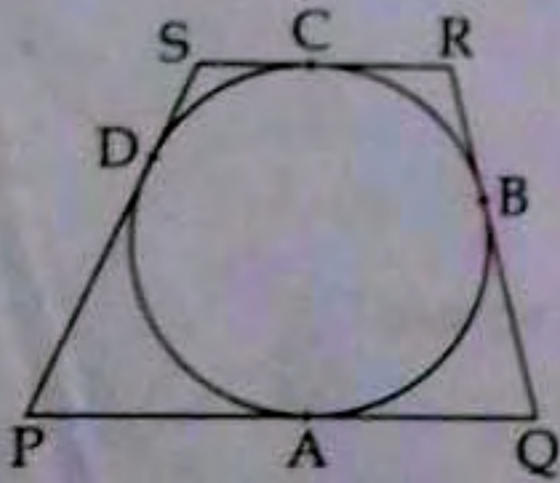
(a) What is the length of PB? 1
 (b) Find the length of PC. 2

P.T.O.

15. In triangle ABC, $\angle B = 90^\circ$, $AB = 3$ centimetres, $\cos A = \frac{3}{5}$.



- (a) What is the length of AC? 1
- (b) Find $\sin A$. 2
16. In the figure, the circle touches the sides of the quadrilateral PQRS at A, B, C and D. $PA = 5$ centimetres, $QB = 4$ centimetres, $RC = 3$ centimetres, $SD = 2$ centimetres.



- (a) What is the length of PD? 1
- (b) Find the perimeter of the quadrilateral PQRS. 2
17. The base radius and slant height of a cone are 6 centimetres and 10 centimetres respectively.

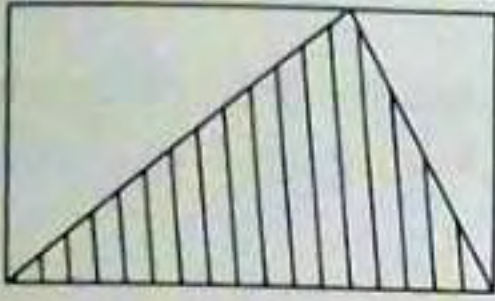
- (a) What is its height? 1
- (b) Find its volume. 2

18. $(3, 4)$ is a point on a circle with centre at the origin.

- (a) Find its radius. 1
- (b) Write the coordinates of the points where the circle cuts the x -axis. 2

- 120
 19. Draw a circle of radius 3 centimetres. Mark a point A on the circle and draw tangent through A. Score 3

20. In the figure, the area of the rectangle is 40 square centimetres.



- (a) What is the area of the shaded triangle? 1
 (b) If a dot is put in the figure without looking into it. What is the probability of it being inside the shaded triangle? 2

(Questions from 21 to 30 carries 4 scores each.)

10x4=40

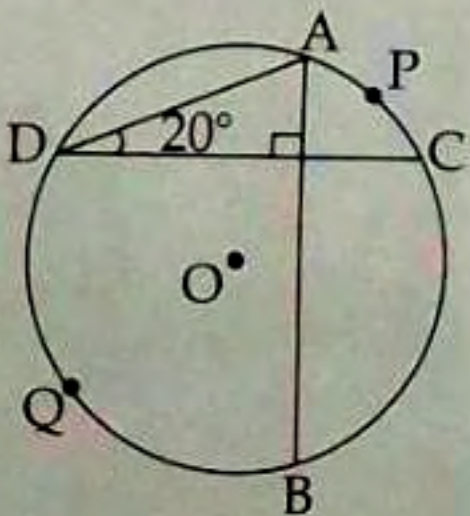
21. The 10th term of an arithmetic sequence is 20 and its 20th term is 10.

- or
 (a) What is its common difference? 2
 (b) What is its 30th term? 1
 (c) Which is the first negative term of this sequence? 1

22. 1, 3, 5, ... is an arithmetic sequence.

- or
 (a) What is its 20th term? 1
 (b) Find the sum of first 20 terms of this sequence. 2
 (c) What is the sum of first 20 terms of the arithmetic sequence 6, 8, 10, ...? 1

23. In the figure, O is the centre of the circle. AB and CD are two perpendicular chords. $\angle D = 20^\circ$.



- (a) Write the measure of $\angle A$. 1
 (b) What is the central angle of arc BQD? 2
 (c) What is the central angle of arc APC? 1

24. (a) Perimeter of a rectangle is 40 centimetres. Write a pair of numbers that can be the measures of its sides. 1
- (b) Perimeter of a rectangle is 40 centimetres and its area is 84 square centimetres. Find the lengths of its sides. 3

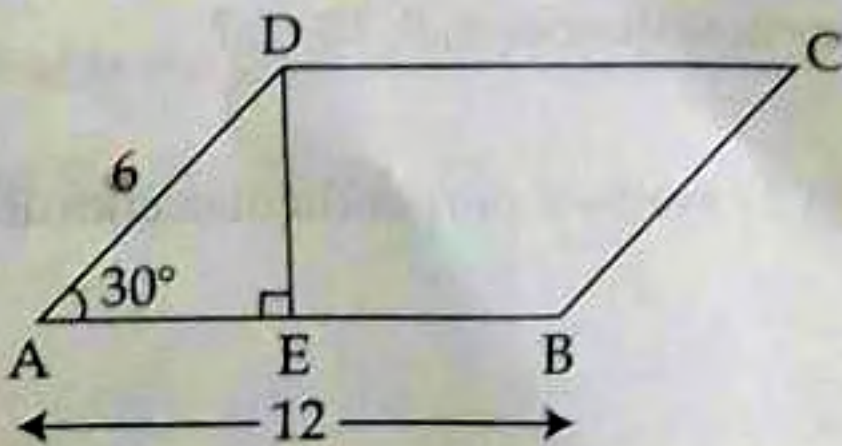
25. A box contains 6 black beads and 4 white beads. Another box contains 5 black beads and 3 white beads. If we take one bead from each box without looking :

- (a) What is the total number of pairs ? 1
- (b) What is the probability that both are black ? 1
- (c) Find the probability of one being black and the other being white. 2

26. (a) $P(x) = x^2 - 5x + 10$. What number is $P(2)$? 1
- (b) Write $P(x) - P(2)$ as the product of two first degree polynomials. 3

27. (a) Draw a circle of radius 3 centimetres. 1
- (b) Mark a point P at a distance of 7 centimetres from its centre. 1
- (c) Draw tangents from P to this circle. 2

28. In the figure, ABCD is a parallelogram, $\angle A = 30^\circ$, $AB = 12$ centimetres, $AD = 6$ centimetres.



- (a) Find the length of DE. 2
- (b) Find the area of the parallelogram ABCD. 2

29. The marks got by 6 students in an examination are given below.
26, 21, 32, 38, 45, 48

- (a) Find the mean of the marks. 2
- (b) What is the median mark ? 2

Score

30. A circle with centre at the origin cuts the y -axis at the point $(0, 5)$.
- (a) Write the coordinates of other two points on this circle.
- (b) What is the radius of this circle?
- (c) Verify whether the point $(4, 4)$ lies on this circle.

2

1

1

(Questions from 31 to 45 carries 5 scores each.)

15x5=75

31. Look at the following number pattern.

1

2 3 4

5 6 7 8 9

- (a) Write the next line of this pattern.
- (b) Write the sequence of last numbers in each line.
- (c) What will be the last number in the 9th line?
- (d) Write the first and last numbers of the 10th line.

1

1

1

2

32. (a) Draw the x, y axes and mark the points $A(1, 0), B(6, 0), C(8, 3), D(3, 3)$.
- (b) Write the most suitable name for quadrilateral ABCD.
- (c) Find its area.

3

1

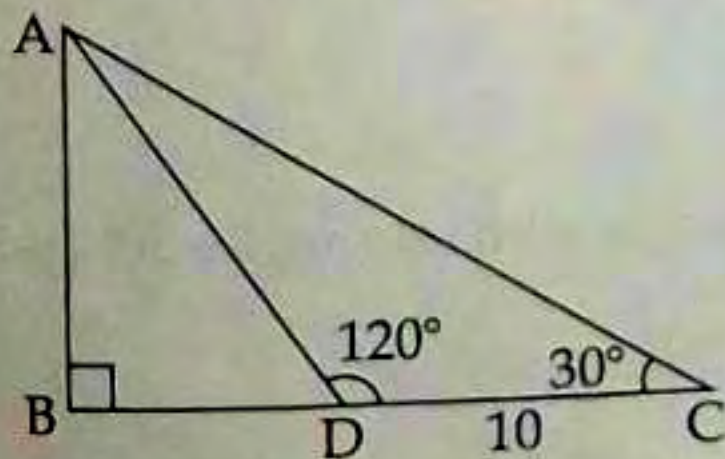
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33. (a) Draw a rectangle of sides 6 centimetres and 3 centimetres.
- (b) Draw a square of same area.

1

4

34. In triangle ABC, $\angle B = 90^\circ, \angle C = 30^\circ, \angle ADC = 120^\circ$. Also $DC = 10$ centimetres.



- (a) What is $\angle DAC$?
- (b) What is the length of AD?
- (c) Find $\angle ADB$.
- (d) Find the lengths of BD and AC.

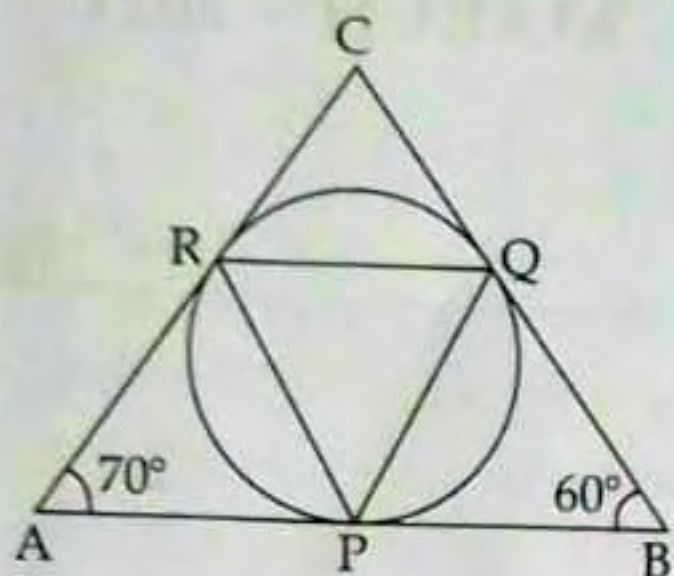
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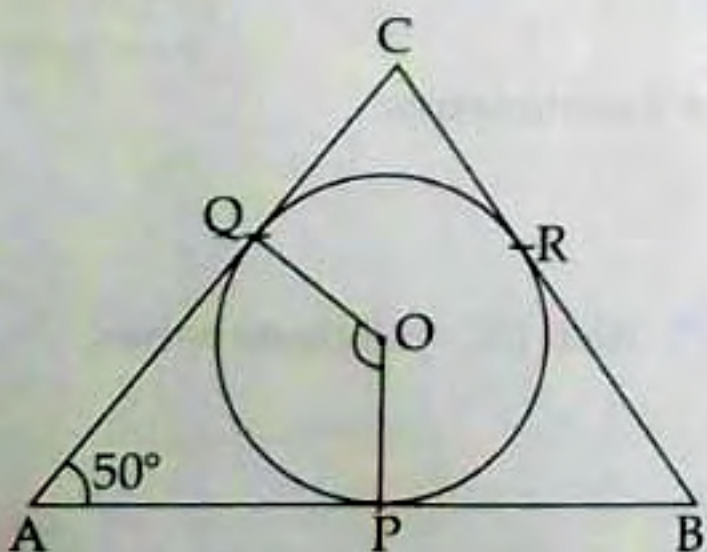
1

2

35. In the figure, the circle touches the sides of triangle ABC at P, Q and R. $\angle A = 70^\circ$, $\angle B = 60^\circ$. Score



- (a) What is the measure of $\angle BPQ$? 2
- (b) What is $\angle PRQ$? 1
- (c) Find the measures of other two angles of triangle PQR. 2
36. The sum of first 31 terms of an arithmetic sequence is 620.
- (a) What is its 16th term? 2
- (b) What is the sum of 15th and 17th terms? 2
- (c) Find the sum of first and 31st terms. 1
37. (a) The circle touches the sides of triangle ABC at P, Q and R, $\angle A = 50^\circ$. What is $\angle POQ$? 1



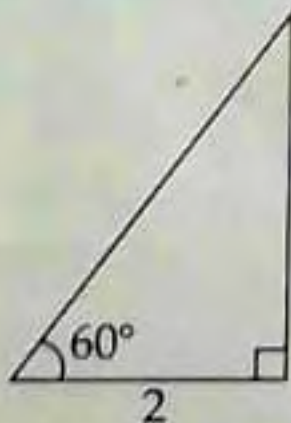
- (b) Draw a circle of radius 2 centimetres. Draw the triangle with two angles 50° and 70° and all its sides as tangents to this circle. 4
38. The diameters of two spheres are in the ratio 2 : 3.
- (a) What is the ratio of their radii? 1
- (b) Find the ratio of their surface areas. 2
- (c) If the surface area of the first sphere is 16π square centimetres. Find the surface area of the second sphere. 2

39. The following table shows the students in a class sorted according to their heights.

Height (centimetres)	Number of Students
130 - 140	9
140 - 150	10
150 - 160	10
160 - 170	9
170 - 180	7
Total	45

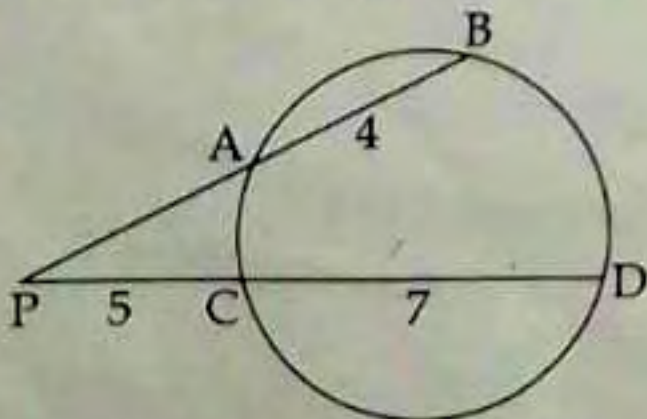
- (a) If the students are arranged in the increasing order of their heights, student at what position will be in the middle? 1
- (b) What is assumed to be the height of the 20th student? 2
- (c) Find the median height. 2

40. (a) The figure shows a ladder leaning against a wall. It makes an angle 60° with the floor. The foot of the ladder is 2 metres away from the wall. Find the length of the ladder. 2



- (b) If the same ladder is kept such that the angle with the floor is 30° , how high will its top be from the floor? How far is the foot of the ladder from the wall? 3

41. In the figure, the chords AB and CD are extended to meet at P. $AB = 4$ centimetres, $PC = 5$ centimetres, $CD = 7$ centimetres.



- (a) What is the length of PD? 1
- (b) If the length of PA is taken as x , then what is the length of PB? 1
- (c) Form a second degree equation in x and find the length of PA. 3

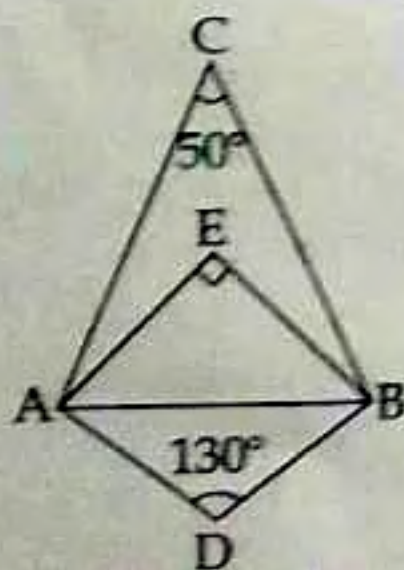
42. The coordinates of the end points of a diameter of a circle are $(3, 4)$ and $(-3, -4)$.

- (a) Write the coordinates of the centre of the circle. 1
- (b) What is the radius of the circle? 2
- (c) Write the equation of this circle. 2

43. The base radius and height of a cylindrical block of wood are 8 centimetres and 15 centimetres. A cone of maximum size is carved out of this.

- (a) What are the radius and height of the cone? 2
- (b) Find its slant height. 1
- (c) Find the curved surface area of this cone. 2

44. In the figure, $\angle AEB = 90^\circ$, $\angle C = 50^\circ$, $\angle D = 130^\circ$.



- (a) If a circle is drawn with AB as diameter, where is the position of E? 1
(Outside the circle ; on the circle ; inside the circle)
- (b) Write the positions of the points C and D with respect to this circle. 2
- (c) Is it possible to draw a circle through the four points A, B, C and D? Why? 2

45. Read the following mathematical concept and answer the questions that follow.

Let us examine the natural numbers, which are powers of 2.

Powers of 2	Digit in the ones place
$2^1 = 2$	2
$2^2 = 4$	4
$2^3 = 8$	8
$2^4 = 16$	6
$2^5 = 32$	2
$2^6 = 64$	4
$2^7 = 128$	8
$2^8 = 256$	6

- (a) Which of the following cannot be the digit in the ones place of a power of 2? 1
 [2, 3, 4, 6]
- (b) Which of the following is the ones place digit in 2^9 ? 1
 [2, 3, 4, 6]
- (c) What is the ones place digit in 2^{100} ? 1
 [2, 4, 6, 8]
- (d) The ones place digit of 2^n is 6. Then the number n can be: 1
 [12, 13, 14, 15]
- (e) $m + n = 26$, then what is the ones place digit of $2^m \times 2^n$? 1
 [2, 8, 4, 6]