

Sl. No.

SSLC MODEL EXAMINATION, FEBRUARY - 2020
MATHEMATICS
 (English)

Time : 2½ Hours

Total Score : 80

Instructions :

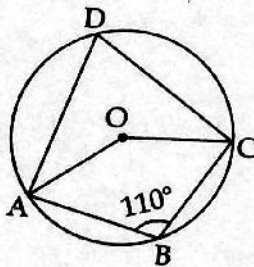
- Read each question carefully before answering.
- Give explanations wherever necessary.
- First 15 minutes is cool-off time. You may use this time to read the questions and plan your answers.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π , etc., using approximations unless you are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

Score

Answer any three questions from 1 to 4. Each question carries 2 scores.

3x2=6

1. In the figure, O is the centre of the circle and A, B, C, D are points on it.
 $\angle B = 110^\circ$

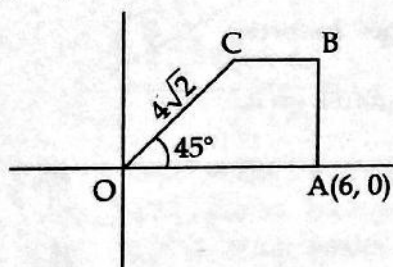


- (a) What is the measure of $\angle D$?
 (b) What is the measure of $\angle AOC$?
2. The second term of an arithmetic sequence is 8 and common difference is 3.
 (a) Write the sequence.
 (b) What is the 12th term of the sequence ?
3. Write the coordinates of the point which divides the line joining A(2, 5) and B(7, 10) in the ratio 3 : 2.
4. If $P(x) = 2x^2 - 3x + 1$, then
 (a) What number is $P(1)$?
 (b) Write a first degree polynomial which is a factor of $P(x)$.

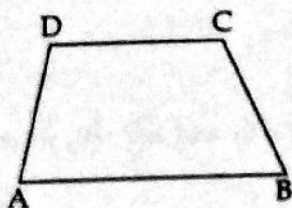
P.T.O.

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

5. The 5th term of an arithmetic sequence is 38 and 8th term is 62.
- What is the common difference of the sequence ?
 - Will the difference between any two terms of this sequence be 100 ? Why ?
6. The length of base edge of a square pyramid is 12 centimetres and slant height is 10 centimetres.
- What is the height of the pyramid ?
 - Calculate the volume of the pyramid.
7. Draw a circle of radius 3 centimetres. Mark a point P at a distance 7.5 centimetres away from the centre. Draw tangents from P to the circle.
8. In the figure, OABC is a trapezium. $OC = 4\sqrt{2}$, $\angle COA = 45^\circ$. Coordinates of A is (6, 0).

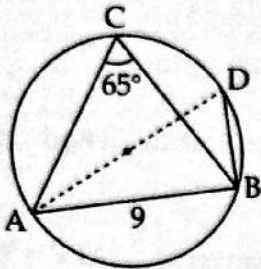


- What is the perpendicular distance from C to OA ?
 - Write the coordinates of B and C.
9. The product of two consecutive multiples of 8 is 768.
- Write this statement in algebraic form.
 - What are the numbers ?
10. In the quadrilateral ABCD, AB and CD are parallel.
 $\angle A + \angle C = 190^\circ$



- If a circle is drawn through A, B and D, where will be the position of C ?
 (Inside the circle, outside the circle, on the circle)
- If $AD = BC$, then prove that a circle can be drawn through the points A, B, C and D.

11. In triangle ABC, $\angle C = 65^\circ$ and $AB = 9$ centimetres. AD is the diameter of the circle.

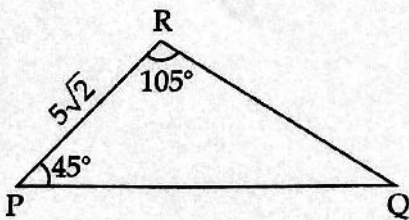


- (a) What is the measure of $\angle ADB$?
 (b) Find the radius of the circumcircle of the triangle ABC.
 ($\sin 65^\circ = 0.90$; $\cos 65^\circ = 0.42$; $\tan 65^\circ = 2.14$)

Answer any seven questions from 12 to 21. Each question carries 4 scores.

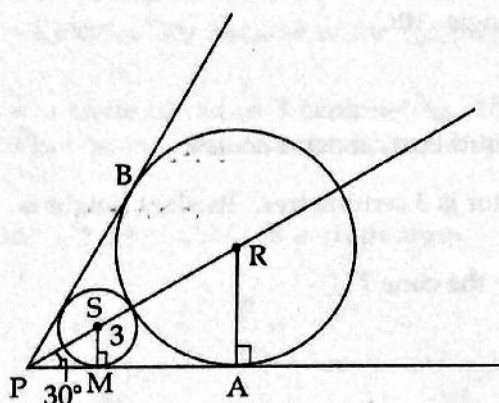
7x4=28

12. The base radius of a cone made by rolling up a sector is 3 centimetres. Its slant height is 15 centimetres.
- (a) What is the radius of the sector used to make the cone ?
 (b) What is the central angle of the sector ?
 (c) Calculate the area of this sector.
13. (a) What is the slope of the line joining the points (2, 7) and (6, 4) ?
 (b) Write the equation of this line.
 (c) If (x, y) is a point on this line, then prove that $(x-4, y+3)$ is also a point on the same line.
14. The sum of first n terms of an arithmetic sequence is $n^2 + 2n$.
- (a) What is the first term ?
 (b) Find the common difference.
 (c) What is the sum of first 20 terms of this sequence ?
 (d) Prove that the sum of continuous terms starting from the first of the sequence 3, 5, 7, added to 1 gives a perfect square.
15. In the triangle, $\angle P = 45^\circ$, $\angle R = 105^\circ$, $PR = 5\sqrt{2}$ centimetres.

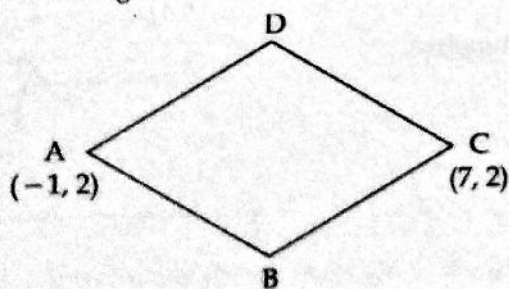


- (a) What is the perpendicular distance from the vertex R to PQ ?
 (b) What is the length of PQ ?
 (c) If the ratio of angles of a triangle is 2 : 3 : 7, write the ratio of its sides.

16. Draw a rectangle of area 15 square centimetres. Draw a square of the same area.
17. The length of a rod is 56 centimetres. It is bent into a rectangle.
- What is the sum of length and breadth of the rectangle ?
 - If the length of diagonal of this rectangle is 20 centimetres, then find the length and breadth of this rectangle.
18. In the figure, S, R are the centres of the circles and PA, PB are common tangents. $\angle APR = 30^\circ$. Radius of small circle is 3 centimetres.



- What is the length of PS ?
 - If the radius of large circle is taken as r , what is the length of PR ?
 - Calculate the radius of large circle.
19. A box contains 6 red beads and 5 white beads. Another box contains 8 red beads and 4 white beads. If one bead is taken from each box, then :
- What is the number of possible pairs ?
 - What is the probability of both beads being red ?
 - What is the probability that both beads are white ?
 - What is the probability of getting at least one red bead ?
20. In the figure, coordinates of two vertices of a rhombus are $A(-1, 2)$ and $C(7, 2)$.



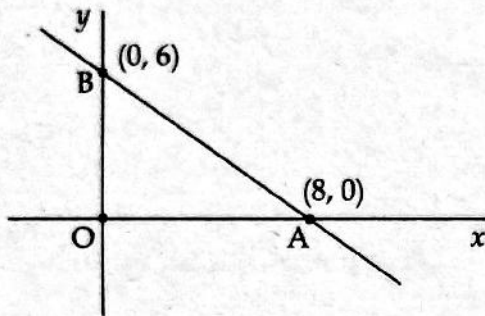
- Write the coordinates of midpoint of the diagonal AC.
- If the length of diagonal BD is 6, write the coordinates of other two vertices.
- Calculate the length of one side of the rhombus.

21. If $p(x) = 3x^2 - 5x + 7$, then
- What number is $p(2)$?
 - Write the polynomial got by subtracting $p(2)$ from $p(x)$.
 - Write $p(x) - p(2)$ as the product of two first degree polynomials.

Answer any five questions from 22 to 28. Each question carries 5 scores.

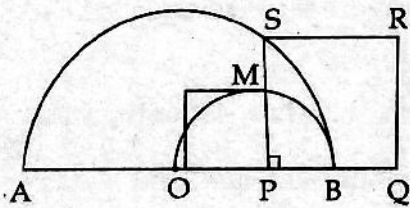
5x5=25

22.



In the figure, O is the origin and $A(8, 0)$, $B(0, 6)$ are two points.

- Write the coordinates of centre of the circle with AB as diameter.
 - Write the equation of the circle.
 - If one end of the diameter of this circle is the origin, write the coordinates of the other end of this diameter.
23. Draw a triangle with radius of incircle 3 centimetres and two of its angles 50° and 70° .
- 24.



In the figure, the radius of the semicircle with centre O is 5 centimetres. $PB = 2$ centimetres.

- What is the length of PA ?
 - What is the area of square PQRS ?
 - Calculate the area of the square with PM as one side.
 - Write the ratio of areas of these two squares.
25. A man, standing at the foot of a tower, sees the top of a building 20 metres away at an elevation of 60° . Climbing to the top of the tower, he sees it at an elevation of 45° .
- Draw a rough figure based on the above facts.
 - What is the height of the building ?
 - Calculate the height of the tower.
(Take $\sqrt{3} = 1.73$)

26. The following table shows the details of daily wages of 45 workers in a factory.

Daily Wages (In rupees)	Number of workers
400 - 500	8
500 - 600	11
600 - 700	10
700 - 800	7
800 - 900	9
Total	45

- (a) What is assumed as the wage of 20th worker, if the workers are arranged in ascending order of their wages ?
- (b) Calculate the median daily wage.
27. The sum of first and 21st terms of an arithmetic sequence is 140.
- (a) What is the 11th term ?
- (b) Write the sequence, if the first term is 10.
- (c) Calculate the sum of first 11 terms of this sequence.
- (d) Find the sum of first 11 terms of the sequence 20, 25, 30,
28. (a) What is the radius of the largest sphere that can be carved from a cube of edge 12 centimetres ?
- (b) Find the surface area and volume of the sphere.
- (c) What is the volume of the cone of maximum size that can be carved from a cube of edge 12 centimetres ?
29. Read the following, understand the mathematical idea in it and answer the questions that follow. Each question carries 1 score. 6x1=6
- We know that a sequence got by starting with any number and adding a fixed number repeatedly is called an arithmetic sequence. Example : 1, 3, 5, 7, Like this we can form sequences by starting with any number and multiplying by a fixed non-zero number repeatedly. For example 1, 2, 4, 8, In this sequence, one number multiplied by 2 gives the next number. Such sequences are called geometric sequences. The common number used for repeated multiplication is called common ratio.
- (a) What is the 5th term of the geometric sequence 1, 2, 4, 8, ?
- (b) Write the geometric sequence with first term 2 and common ratio 3.
- (c) What is the common ratio of the geometric sequence 3, 12, 48, ?
- (d) Write the 10th term of the geometric sequence 1, -1, 1,
- (e) What is the sum of 10 consecutive terms of the geometric sequence 1, -1, 1, ?
- (f) Which of the following numbers will not be a term of any geometric sequence ?

$$\left(\pi, 0, \sqrt{2}, \frac{1}{\pi} \right)$$