VIJAYAPADHAM

KOTTARAKKARA EDUCATIONAL DISTRICT
SSLC PRE MODEL EXAMINATION 2022-23

PM 01 MM 10 E **Time : $2\frac{1}{2}$ Hours**

Class : X **Total Score : 80**

MM 9 E

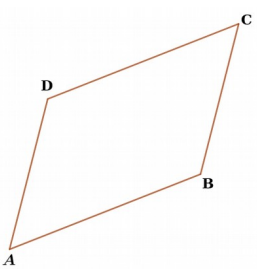
MATHEMATICS

Instructions

- **Read each questions carefully before writing the answer.**
- **Give explanations wherever necessary.**
- **First 15 minutes is Cool- off time. You may use the 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 score. **(3 x 2 = 6)**

1. The algebraic form of an arithmetic sequence is $4n+3$.
   (a) What is the first term of the sequence ?
   (b) What is its common difference ?
2. The letters of the word **STATISTICS** are written in paper slips and put in a box. A child is asked to take one slip from the box without looking.
   (a) What is the probability of getting the letter A ?
   (b) What is the probability of getting the letter S ?
3. The coordinates of three vertices of a parallelogram are A(2 , 3) , B (7, 5) and C (8 , 9). Find the coordinates of the fourth vertex D.



4. Write x^2-1 as the product of two first degree polynomials.

Answer any *four* questions from 5 to 10. Each question carries 3 score. **(4 x 3 = 12)**

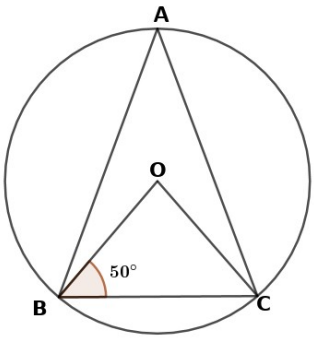
5. The algebraic expression for the sum of first n terms of an arithmetic sequence is n^2+3n .

   (a) Find the sum of first 10 terms.

   (b) What is its first term ?

   (c) Find the common difference.

6. In the figure, O is the centre of the circle. $\angle OBC = 50^0$.



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

   (b) What is the measure of $\angle BOC$?

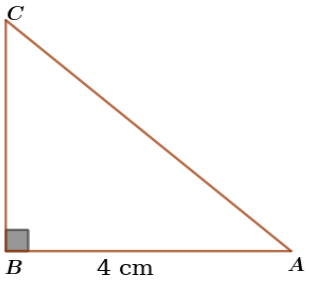
   (c) What is the measure of $\angle A$?

7. The product of a natural number and eight more that it is 105.

   (a) What is the least number to be added to make the product a perfect square ?

   (b) Find the number.

8. In triangle ABC, $\angle B = 90^0$, AB = 4 centimetres, cos A = $\frac{4}{5}$.



   (a) What are the lengths of AC and BC ?

   (b) Find the value of sin A.

9. Draw a circle of radius 3 centimetres. Mark a point P at a distance 8 centimetres from the centre of the circle. Draw two tangents from P to the circle.

10. Draw the x , y axis and mark the points A(3, 5) and B(5, 3).

Answer any *eight* questions from 11 to 21. Each question carries 4 score. **(8 x 4 = 32)**

11. The length of the base edge of a square pyramid is 12 cm and the slant height is 10 centimetres.

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

   (b) What is the height of the pyramid ?

   (c) Calculate the volume of the pyramid.

12. Consider the number pattern given below:

1

2 3

4 5 6

7 8 9 10

.....

(a) Write the next line.

(b) Find the first and last number in the 10^{th} line.

(c) Find the sum of numbers in the 10^{th} line.

13. A box contains 6 black beads and 4 white beads. Another box contains 5 black beads and 4 white beads. If one bead is taken from each box, then:

(a) What is the number of possible pairs ?

(b) What is the probability of both being black ?

(c) What is the probability of both being white ?

(d) What is the probability of getting at least one white bead ?

14. The perimeter of a rectangular field is 50 cm and its area is 144 square centimetres.

(a) length + breadth = ...

(b) If we take the breadth as x, what is its length ?

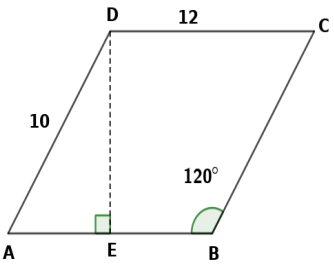
(c) Find the length and breadth of the rectangle.

15. In the figure, ABCD is a parallelogram with CD = 12 centimetre, AD = 10 centimetre and $\angle B = 120^0$

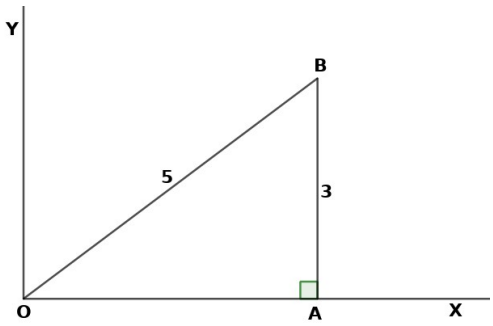
(a) What is the measure of $\angle A$?

(b) What is the perpendicular distance from D to AB ?

(c) Calculate the area of the parallelogram ABCD.



16. In the figure, O is the origin. If OB = 5 and AB = 3



(a) What is the length of OA ?

(b) Write the coordinates of O, A and B.

17. If $P(x) = x^2 - 5x + 7$,

(a) Find P(1).

(b) Write P(x) – P(1) as the product of two first degree polynomials.

(c) Find the solutions of the equation P(x) – P(1) = 0.

18. A sector of central angle 216^0 and radius 25 centimetres is rolled up into a cone.

(a) What is its slant height and radius of the cone so formed ?

(b) What is the height of the cone ?

(c) Find its volume.

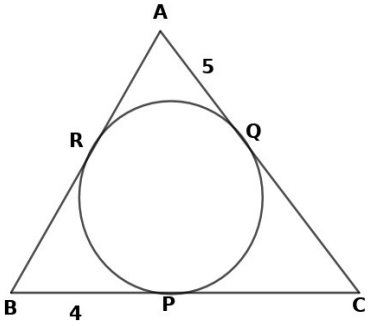
19. Draw a triangle of circumradius 4 cm, and two of the angles 40^0 and 50^0.

20. (a) What is the slope of the line passing through the points (1, 3) and (2, 5)?

(b) Write the equation of the line.

21. In the figure, sides of triangle ABC touches the circle at P, Q and R.

AQ = 5 centimetres BP= 4 centimetres and AB = AC.



(a) What is the length of BR ?

(b) What is the length of AB ?

(c) Find the perimeter of triangle ABC.

<u>Answer any *six* questions from 22 to 29. Each question carries 5 score.</u> **(6 x 5 = 30)**

22. The sum of the first 9 terms of an arithmetic sequence is 189 and the sum of the first 15 terms is 495.

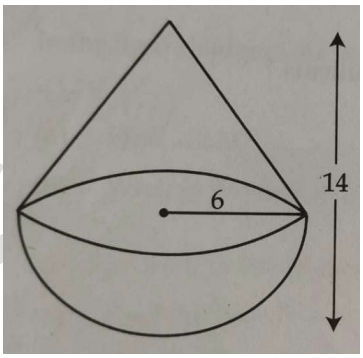
(a) What is the 5^{th} term of the sequence ?

(b) What is the 8^{th} term of the sequence ?

(c) What is the sum of first 21 terms of the sequence ?

23. Draw a circle of radius 2.5 centimetres. Draw a triangle of angles 50^0, 60^0, 70^0 with all its sides touching the circle.

24. A solid is formed by joining a hemisphere and a cone of same radius; as shown in the figure. Radius of the hemisphere is 6 centimetre and total height of the solid is 14 centimetres.

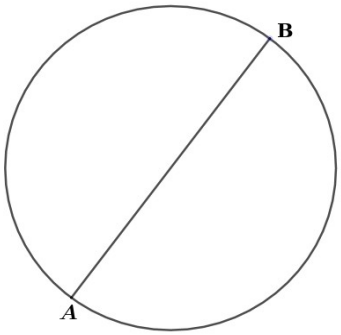


(a) What is the height of the conical part ?

(b) Find the volume of the solid.

25. Draw a rectangle with length 5 centimetres and breadth 3 centimetres; and construct a square of the same area.

26. In the figure, A (0, 1) and B (6, 9) are the ends of diameter of the circle.



(a) Write the coordinate of the centre of the circle.

(b) Find the radius of the circle.

(c) Write the equation of the circle.

27. A boy saw the top of a building under construction at an elevation of 30^0. The completed building was 10 meter higher and the boy saw its top at an elevation of 60^0 from the same spot.

(a) Draw a rough figure based on the given details.

(b) What is the height of the building ?

(c) What is the distance between the building and the boy ?

28. The table below shows some students sorted according to their scores in an exam.

Score	Number of Students
20 – 30	3
30 – 40	6
40 – 50	7
50 – 60	10
60 – 70	9
70 – 80	4

(a) If the students are arranged in ascending order of their scores, score of which student is taken as the median score ?

(b) What is assumed as the score of the 17^{th} student ?

(c) Find the median score.

29. Consider the sequence of perfect squares 1, 4, 9, 16..... When we divide these terms by the number 3, the remainders obtained have a recurring property. To understand this examine the table below :

Number	1	4	9	16	25	36	49	-	-
Remainder	1	1	0	1	1	0	1	-	-

(a) What is the 10^{th} term of the sequence 1, 4, 9..... ?

(b) What are the remainders got on dividing perfect squares by 3 ?

(c) Write the sequence of perfect square which leaves the remainder zero on division by 3.

(d) What is the 10^{th} term of the sequence of perfect squares which leave remainder zero on division by 3 ?

(e) What will be the remainder on dividing the terms of the sequence $5^2, 8^2, 11^2, \ldots$ by 3 ?.

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