

Instructions

- There is a 'cool off' time of 15 minutes in addition to the writing time. Use this time to get familiar with questions and plan your answers.
- Read the instructions carefully before answering the questions.
- Keep in mind, the score and time while answering the questions. Give explanations wherever necessary.
- No need to simplify irrationals like $\sqrt{2}, \sqrt{3}, \pi$ etc., using approximations unless you are asked to do so.

Answer any 3 Questions from 1 to 4. Each question carries 2 scores.

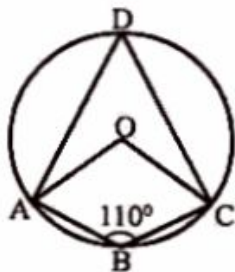
(3 x 2 = 6)

1. 3, 7, 11, ... is an arithmetic sequence.
 - a) What is the common difference ?
 - b) Find its 11th term.

2. In the figure, O is the centre of the circle.

$$\angle ABC = 110^\circ$$

- a) What is the measure of $\angle ADC$?
- b) What is the measure of $\angle AOC$?



3. Natural numbers from 5 to 20 are written on paper slips and put in a box.
 - a) How many paper slips are there in the box ?
 - b) A slip is to be taken from it without looking, what is the probability of it being a perfect square ?
4. Subtracting 3 from a number and squaring it, gives 81. What is the number ?

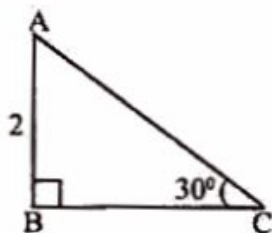
Answer any 4 Questions from 5 to 10. Each question carries 3 scores.

(4 x 3 = 12)

5. In the figure, ABC is a right triangle.

$$\angle C = 30^\circ, AB = 2 \text{ centimetres}$$

- a) AC = _____ centimetres
- b) Find the perimeter of triangle ABC.

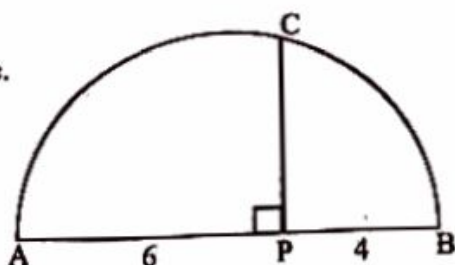


6. The 7th term of an arithmetic sequence is 48 and its 13th term is 66.
- What is the common difference of this sequence ?
 - Find its 10th term.

7. In the figure, AB is the diameter of the semicircle.
PA = 6 centimetres, PB = 4 centimetres.

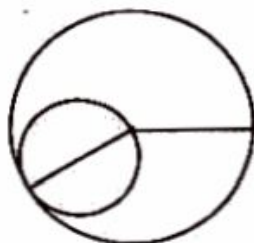
a) $PC =$ _____
(10, $\sqrt{10}$, 24, $\sqrt{24}$)

- b) Draw an equilateral triangle with PC as a side.



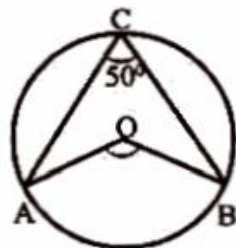
8. The product of two consecutive odd numbers is 143.
- Write a second degree equation based on the above statement.
 - What are the numbers ?
9. Find the sum of the following arithmetic sequences.
- $1 + 2 + 3 + \dots + 30$
 - $4 + 8 + 12 + \dots + 120$
 - $1 + 5 + 9 + \dots + 117$

10. In the figure, radius of the large circle is the diameter of small circle. A dot is put in to the figure without looking, what is the probability that the dot is in the shaded region ?



Answer any 8 Questions from 11 to 21. Each question carries 4 scores. (8 x 4 = 32)

11. a) In the figure, O is the centre of the circle.
 $\angle ACB = 50^\circ$, What is the measure of $\angle AOB$?
(25° , 100° , 130° , 310°)
- b) Draw a triangle of circumradius 3.5 centimetres and two of the angles 50° and 65° .



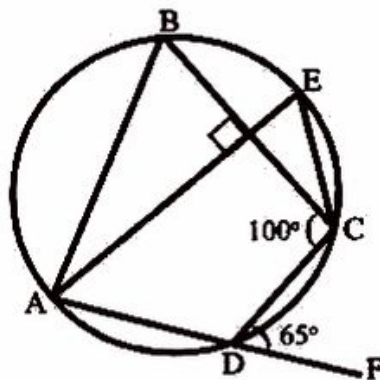
12. The sum of 12th and 18th terms of an arithmetic sequence is 126.
- What is the sum of first and 29th terms of this sequence ?
 - Find its 15th term.
 - Find the sum of first 29 terms of this sequence.

13. Perimeter of a rectangular shaped swimming pool is 120 metres and its area is 896 square metres.

- Length + Breadth = _____
- Form a second degree equation based on the given statement.
- Find the length and breadth of this swimming pool.

14. In the figure, A, B, C, D, E are points on the circle.

$$\angle BCD = 100^\circ, \angle CDF = 65^\circ$$



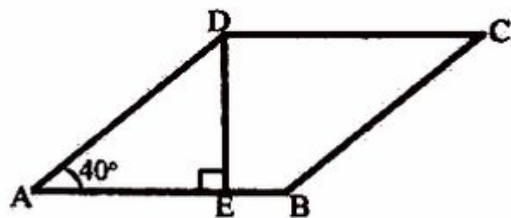
- $\angle ABC =$ _____
- $\angle AEC =$ _____
- $\angle BCE =$ _____
- $\angle DAE =$ _____

15. A box contains blue and yellow balls. Total number of balls is 36. Number of blue balls is 12. If a ball is taken from it, then

- What is the probability of it being yellow ?
- A few more blue balls are put in this box, then the probability of getting a yellow ball becomes $\frac{1}{2}$. How many blue balls are there in the box now ?

16. In the figure ABCD is a rhombus and its perimeter is 68 centimetres, $\angle DAE = 40^\circ$.

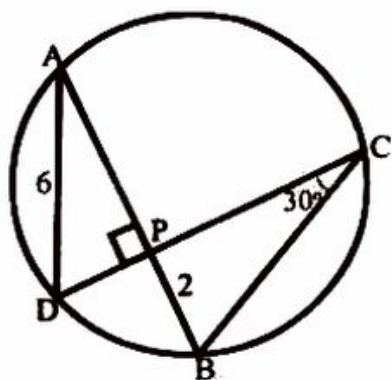
- What is the length of a side of the rhombus ?
($17\sqrt{2}$, 24, 17, 34)
- Find the length of DE.
- Find the area of the rhombus ABCD.
($\sin 40^\circ = 0.643$, $\cos 40^\circ = 0.766$)



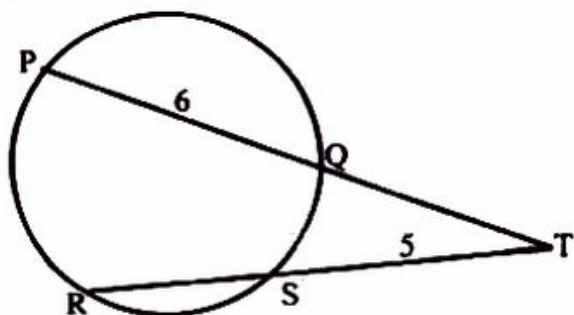
17. The algebraic form of an arithmetic sequence is $5n - 2$.

- What is its common difference ?
- What is the remainder obtained when the terms of this sequence is divided by 5 ?
- Is 2024 a term of this sequence ? why ?

18. In the figure, chords AB, CD meet at the point P.
 AB is perpendicular to CD.
 $\angle PCB = 30^\circ$, PB = 2 centimetres,
 AD = 6 centimetres.



- What is the measure of $\angle DAB$?
 - Find the length of PD.
 - Find the length of the chords AB, CD.
19. The sum of first n terms of an arithmetic sequence is $n^2 + 12n$.
- What is the first term of this sequence ?
 - What is the common difference ?
 (1, 2, 12, 15)
 - How many consecutive terms of this sequence are to be added to get the sum 364 ?
20. In the figure chords PQ, RS meet at the point T.



- What is the length of TQ ?
 - $TP \times TQ = \underline{\hspace{2cm}}$
 - Find the length of RS.
21. Consider the sequence of numbers between 100 and 400 which leaves a remainder 2 on division by 3.
- Which is the first term in the sequence ?
 (100, 101, 102, 103)
 - Which is the last term in the sequence ?
 - How many such numbers are there in this sequence ?
 - Find the sum of all terms in this sequence.

Answer any 6 Questions from 22 to 29. Each question carries 5 scores.

(6 x 5 = 30)

22. Draw a rectangle of sides 7 centimetres and 3 centimetres.
 Draw a square of the same area.

23. In a school, there are 20 girls and 25 boys in the Maths Club. In Science Club, there are 35 girls and 15 boys. One student is to be selected from each club.
- What is the total number of possible selections ?
(95, 700, 1075, 2250)
 - What is the probability of both being girls ?
 - What is the probability of both being boys ?
 - What is the probability of atleast one boy ?

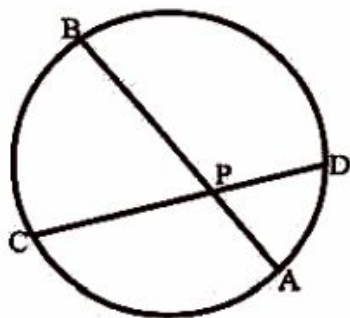
24. Sum of the first 9 terms of an arithmetic sequence is 225 and sum of the first 12 terms of the sequence is 372.
- What is its 5th term ?
 - What is its 11th term ?
 - Find its common difference.
 - Find the sum of first 21 terms of this sequence.

25. In the figure chords AB, CD meets at the point P.

AB = 22 centimetres.

PA = 6 centimetres.

CD = 20 centimetres.

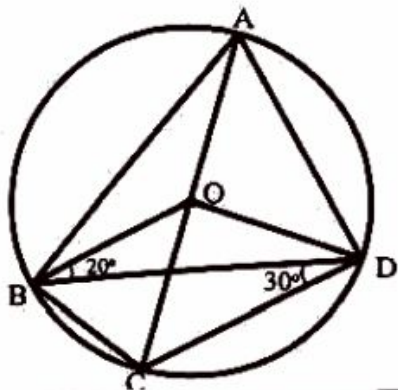


- What is the length of PB ?
 - If the length of PC is x , then what is the length of PD ?
 - Find the length of PC and PD.
26. 7, 13, 19, ... is an arithmetic sequence.
- What is the common difference ?
 - Write the algebraic form of the sequence.
 - Find the position of 97 in this sequence.
 - Find the sum of first 16 terms of this sequence.





27. In the figure, O is the centre of the circle.

$\angle OBD = 20^\circ$, $\angle BDC = 30^\circ$.

- $\angle ODB =$ _____
- $\angle BOD =$ _____
- $\angle BAC =$ _____
- $\angle BCD =$ _____
- $\angle COD =$ _____



28. In a right triangle one of the perpendicular side is 5 centimetres more than the other and the area of the right triangle is 52 square centimetres.
- If the length of the smaller perpendicular side is taken as x , what is the length of the other perpendicular side ?
 - Write a second degree equation using the given details.
 - Find the lengths of the perpendicular sides.
29. The table given below shows the relation between polygons and the number of their diagonals. Analyse the table and write the answers to the questions given below.

Polygon	Number of sides	Diagonals	Number of diagonals from one vertex	Total number of diagonals
Triangle	3		$3-3 = 0$	$\frac{3 \times 0}{2} = 0$
Quadrilateral	4		$4-3 = 1$	$\frac{4 \times 1}{2} = 2$
Pentagon	5		$5-3 = 2$	$\frac{5 \times 2}{2} = 5$
Hexagon	6		$6-3 = 3$	$\frac{6 \times 3}{2} = 9$
.....
.....

- Write the name of the polygon, whose number of sides and total number of diagonals are equal ?
- How many diagonals can be drawn from one vertex of a 10 sided polygon ?
- What is the total number of diagonals of a 12 sided polygon.
- How many diagonals can be drawn from one vertex of an n - sided polygon.
- What is the total number of diagonals of an n - sided polygon.