

First Terminal Evaluation - 2018
MATHEMATICS - X

Time: 2½ Hours

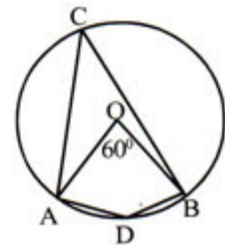
Score: 80

Instructions

- ◆ Read the instructions carefully before answering the questions.
- ◆ Give explanations wherever necessary.
- ◆ Simplification using approximate values of $\pi, \sqrt{2}, \sqrt{3}$ need to be done only if specifically asked.
- ◆ First 15 minutes time is cool-off time.

Answer any three from questions 1 to 4. Each question carries 2 scores. (3 × 2 = 6)

1. The second term of an arithmetic sequence is 18 and its fourth term is 32. Write its third and first terms.
2. O is the centre of the circle. $\angle AOB = 60^\circ$. Then,
 $\angle ACB =$ _____
 $\angle ADB =$ _____

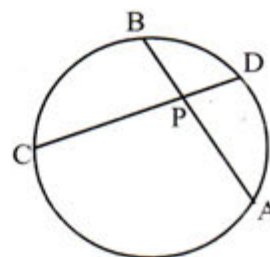


3. Teacher asked a student to say a two digit number,
 - a) What is the probability of that number being 17?
 - b) What is the probability of it being a perfect square?
4. When each side of a square was reduced by 2 metres, its area became 49 sq. m. What was the side of the first square?

Answer any five from questions 5 to 11. Each question carries 3 scores. (5 × 3 = 15)

5.
 - a) $1 + 2 + 3 + \dots + 20 = \dots\dots\dots$
 - b) $7 + 14 + 21 + \dots + 140 = \dots\dots\dots$
 - c) $-1 + 6 + 13 + \dots + 132 = \dots\dots\dots$
6. The angles of a cyclic quadrilateral are the consecutive terms of an arithmetic sequence and one of the angles is 45° .
 - a) What is the measure of the angle opposite to 45° angle?
 - b) Find the measures of other two angles of the quadrilateral.

7. A box contains three paper slips numbered 1, 2, 3 and another contains three slips numbered 2, 3, 4. If one paper slip is taken from each without looking,
- What are the possible pairs of numbers?
 - What is the probability of both the numbers being odd?
 - What is the probability of their sum being 4?
8. The algebra of sum of an arithmetic sequence is $n^2 + 2n$.
- What is the sum of first 10 terms of this sequence?
 - How many terms from the first are needed to get the sum 168?
9. The circum radius of a triangle is 4 cm. Two angles of this triangle are 40° , 60° . Draw the triangle.
10. The sum of the 1st and 17th terms of an arithmetic sequence is 40. The sum of its 1st and 18th terms is 43.
- What is its common difference?
 - What is the sum of its 7th and 11th terms?
 - Find its 9th term.
11. In the figure, $PC = 16$ cm, $CD = 18$ cm, $PA = 2$ PB
- What is the length of PD?
 - Calculate the length of PA.

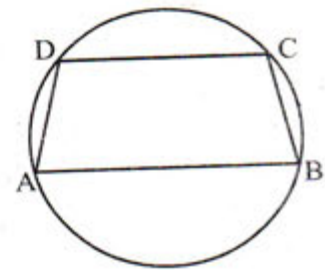


Answer any seven from questions 12 to 21. Each question carries 4 scores. ($7 \times 4 = 28$)

12. The sum of first 6 terms of an arithmetic sequence is 99. Its 6th term is 39.
- What is the sum of its 3rd and 4th terms?
 - Which is the 3rd term?
 - Write the sequence.
13. Draw a rectangle of area 8 sq. cm. Draw a square of the same area.
14. 7th term of an arithmetic sequence is 17 and its 17th term is 7.
- What is its common difference?
 - Find 24th term.
 - What is the sum of first 47 terms?
 - What is the sum of first 48 terms?

15. All the vertices of trapezium ABCD are on a circle. $\angle A = x$

- What is the measure of $\angle D$?
- What is the measure of $\angle B$?
- Whether AD, BC are equal? Justify.



16. The algebra of an arithmetic sequence is $4n - 1$.

- What is the common difference?
- What is the remainder when each term is divided by the common difference?
- Verify whether 2018 is a term of this sequence.

17. A box contains some green and blue balls. 5 red balls are added to that box and then a ball is taken from it. The probability of that ball being red is $\frac{5}{22}$ and the probability of it being blue is $\frac{1}{2}$.

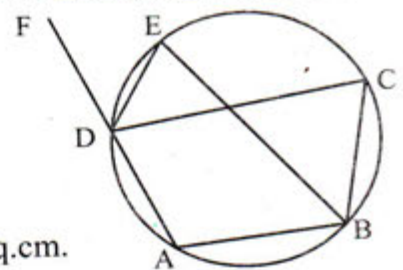
- What is the total number of balls in the box?
- What is the number of blue balls?
- What is the probability of getting a green ball from the box?
- What is the probability of getting either a red or a blue ball?

18. a) What is the value of the polynomial $x^2 + 12x$ when $x = 1$?

b) For which natural number x , the value of the polynomial becomes 589?

19. In the figure, all vertices of quadrilateral ABCD are points on a circle. BE is the bisector of $\angle ABC$

- If $\angle ABC = 100^\circ$ then what is the measure of $\angle FDC$?
- Prove that DE is the bisector of $\angle FDC$.

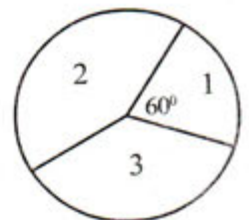


20. The perimeter of a rectangle is 42 cm and its area is 20 sq.cm.

- What is the sum of length and breadth?
- Find the length and breadth.

21. The circle with centre O is divided into three sectors as shown in the figure. Central angle of the first sector is 60° . If we put a dot inside the circle without looking into it,

- What is the probability of the dot to be in the first sector?
- If the probability of the dot to be in the second sector is $\frac{5}{12}$, what is its central angle?
- Find the probability of the dot to be in the third sector.



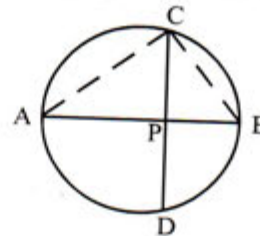
Answer any five from questions 22 to 28. Each question carries 5 scores ($5 \times 5 = 25$)

22. a) Complete the following table.

Arithmetic Sequence	$7n - 1$	$5n + 1$
7 th term		
Sum of first 13 terms		
Ratio of their 7 th terms		
Ratio of sum of their first 13 terms.		

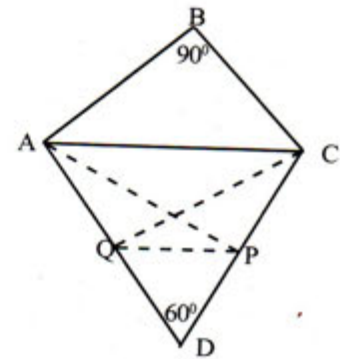
b) If the sum of first 21 terms of two arithmetic sequences are in the ratio 1:2 and 11th term of the first sequence is 35, What is the 11th term of the second sequence?

23. In the figure AB is the diameter of the circle. CD is perpendicular to AB. PA = 3 cm, PB = 2 cm



- What is the length of PC?
- Find the area of triangle ABC.
- Draw a rectangle of area $5\sqrt{6}$ sq. cm

24. In the figure $\angle B = 90^\circ$, $\angle D = 60^\circ$



- If we draw a circle with AC as diameter, where will be the point D, inside or outside the circle? Why?
- What about the position of B?
- AP is perpendicular to CD and CQ is perpendicular to AD. Prove that quadrilateral ACPQ is cyclic.

25. a) What is the common difference of the arithmetic sequence $2, \frac{8}{3}, \frac{10}{3}, \dots$?

b) Write the sequence of integer terms of this sequence.

c) Write the sequence of numbers representing their positions in order.

d) What will be the second integer term of the arithmetic sequence with first term 3 and common difference $\frac{7}{9}$? What is the number representing the position of that term?

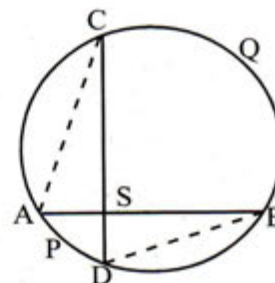
26.

1				
2	3			
4	5	6		
7	8	9	10	
...
...

- a) Write the next line of the above number pattern.
- b) What is the last number in the 10th line?
- c) What is the sum of all numbers in first 10 lines?
- d) If we write the terms of the arithmetic sequence 3, 7, 11, ... in a pattern like this, what will be the last number in the 10th line?

27. In the figure AB and CD are two mutually perpendicular chords. If $\angle C = x^\circ$, then

- a) What is the measure of $\angle B$?
- b) What is the measure of $\angle D$?
- c) What is the sum of central angles of arcs APD and BQC?
- d) If length of arc APD is 3 cm and that of arc BQC is 7 cm, find the perimeter of the circle.



28. There are two taps opening into a water tank. If both are opened, the tank will be filled in 12 minutes. The time taken by the smaller tap alone to fill the tank is 10 minutes more than that taken by the larger tap alone.

- a) If two taps are opened simultaneously, what portion of the tank will be filled in 6 minutes?
- b) What portion of the tank would be filled in one minute if both the taps are opened?
- c) Find the time taken by the smaller tap alone to fill the tank.

Read the mathematical concept explained below and answer the questions that follow.

29. Consider the sequence of perfect squares 1, 4, 9, 16, When we divide these terms by a natural number, the remainders obtained have a recurring property. For example, remainders obtained on dividing these numbers by 3 have a cyclic property. To understand that examine the table below.

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

- a) What is the 10th term of the sequence 1, 4, 9,? (1)
- b) What are the remainders got on dividing perfect squares by 3? (1)
- c) Write the sequence of perfect squares which leave remainder 0 on division by 3 (1)
- d) What is the 10th term of the sequence of perfect squares which leave remainder 0 on division by 3? (1)
- e) What will be the remainder on dividing the terms of the sequence $5^2, 8^2, 11^2, \dots$ by 3? (1)
- f) Write an arithmetic sequence with no perfect square term. (1)

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