SUMMATIVE ASSESSMENT TERM – TERM 1 2025 - 26

Class 10

SAMPLE QUESTION PAPER - MATHEMATICS

Qn no	Key	Score
	SECTION A	
1	(ii) 81	1
2	c. Both are true , B is the reason for A.	1
3 (A)	As the positions increase by 3 , the terms of this sequence decrease by 20 . (i) 10^{th} term = 60 – 20 = 40 OR 10^{th} term = 80 – 40 = 40 (ii) First term = 80 + 20 = 100 OR First term = 60 + 40 = 100	1 1 1
3 (B)	(I) The difference of any two terms of this sequence can be 56. (In this sequence , change in terms = 7 x change in position , 56 = 7 x 8) (ii) Yes. 302 is a term of this sequence . (302 – 8 = 294 = 7 x 42) 302 is the 43^{rd} term of this sequence . (Change in position = 42)	1 1 1
4	(i) 3^{rd} term = $\frac{40}{5} = 8$ (ii) 7^{th} term = $\frac{260}{13} = 20$ (ii) Common difference = 3 (As the positions increase by 4 , the terms of this sequence increase by 12] First term = 8 – 2 x 3 = 2 OR First term = 20 – 6 x 3 = 2 First 3 terms = 2 , 5 , 8	1 1 1 1
5	(i) 4^{th} term + 5^{th} term = $\frac{240}{4} = 60$ (ii) 6^{th} term = 60 – 15 = 45 (3^{rd} term + 6^{th} term = 60) (ii) 30 , 30 , 30 , 30 , 30 , 30 , 30 , 30 23 , 25 , 27 , 29 , 31 , 33 , 35 , 37 16 , 20 , 24 , 28 , 32 , 36 , 40 , 44 (We can write any arithmetic sequence satisfying sum of the two terms is 60 with sum of their positions is 9]	1 1 1 1 1
	SECTION B	
6	(ii) subtract 5.	1
7	(ii) 3 ($x^2 - 6x + 9 = 0 \implies (x-3)^2 = 0$)	1
8	$x_n = 6n-3 = 3(2n-1)$ [$x_n = dn + f - d$] $x_n^2 = [3(2n-1)]^2 = 9 \times (2n-1)^2$ The numbers with algebraic form $2n-1$ are odd numbers .The square of any odd number is again odd. So the square of any term of this arithmetic sequence is the product of an odd number by 9 .	1 1 1

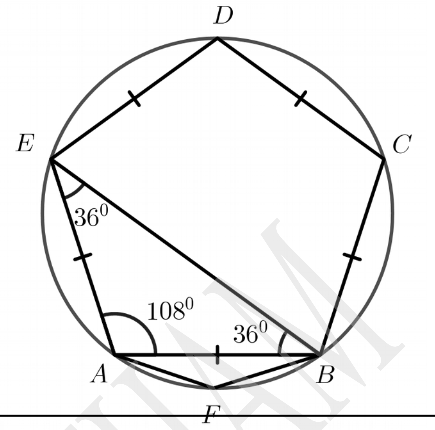
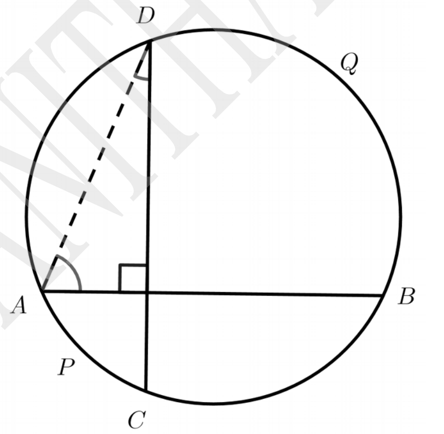
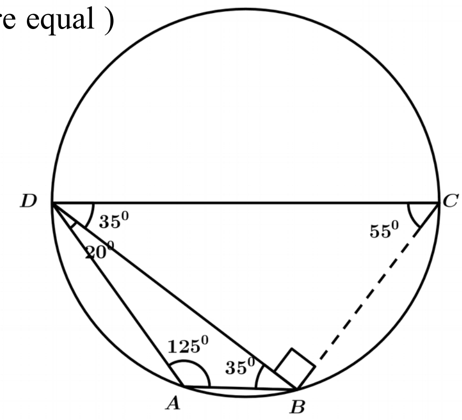
SARATH A S , HST MATHS , GHSS KUTTIPPURAM , MALAPPURAM

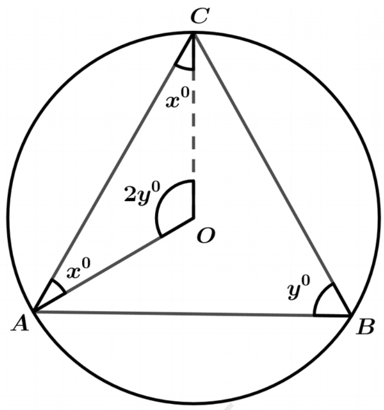
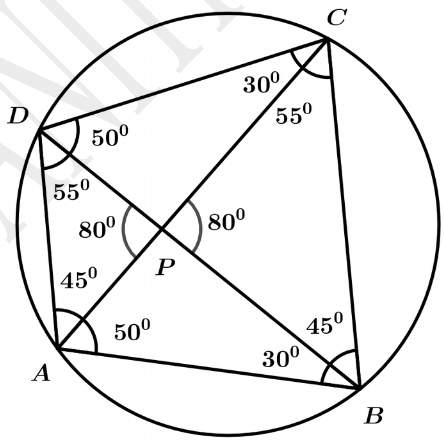
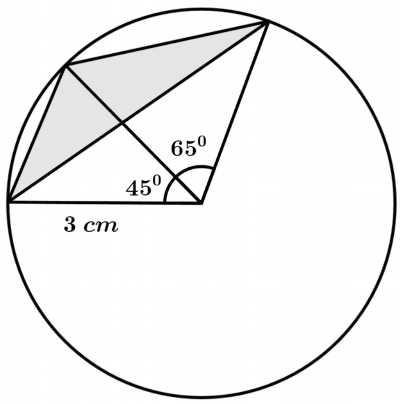
	Another method $x_n = 6n-3$ $x_n^2 = (6n-3)^2 = 36n^2 - 36n + 9 = 9(4n^2 - 4n + 1)$ Multiples of 4 are even . 1 added to the multiples of 4 are odd. So the square of any term of this arithmetic sequence is the product of an odd number by 9 . **Another method** Each term of this sequence got by multiplying an odd number by 3. So the square of any term of this sequence is the product of the square of an odd number by 9 . Since the square of any odd number is odd , the square of any term of this sequence is the product of the square of an odd number by 9 .	
9	(i) If both numbers are 3 , then their sum is 6 and their product is 9 .This is not possible. (Product of the numbers is 7) . Since the sum of the numbers is 6, the first number is how much more than 3 , then the second number should be that much less than 3 (ii) If we take the numbers as $3 + x$ and $3 - x$, then $(3+x)(3-x) = 7$ $9 - x^2 = 7$ $x^2 = 2$ $x = \sqrt{2}$ ∴ Numbers $= 3 + \sqrt{2}$, $3 - \sqrt{2}$	1 1 1 1
10	(i) $26 - 23 = 3$ (ii) The difference of any terms at the same position of these sequences is 3 . So the sum of the first 25 terms of the second sequence is 25 x 3 = 75 more than the sum of the first 25 terms of the first sequence .	1 1 2
11	(i) First term = 5 Second term = 16 – 5 = 11 $[\ x_1 + x_2 = 16\ ]$ (ii) Common difference = 11 – 5 = 6 $x_n = 6n + 5 - 6 = 6n - 1$ $[\ x_n = dn + f - d\ ]$	1 1 1 1
12(A)	If we take the lengths of the sides as x centimetre and $x + 14$ centimetre, then $x^2 + (x+14)^2 = 26^2$ $2x^2 + 28x + 196 = 676$ $2x^2 + 28x = 480$ $x^2 + 14x = 240$ $x^2 + 14x + 7^2 = 240 + 7^2$ $(x+7)^2 = 289$ $x + 7 = \sqrt{289} = 17$ $x = 10$ Lengths of the sides = 10 centimetre , 24 centimetre	1 1 1 1

12(B)	If we take the lengths of the perpendicular sides as x centimetre and $x+7$ centimetre , then $\frac{1}{2} \times x(x+7) = 60$ $x(x+7) = 120$ $x^2 + 7x = 120$ $x^2 + 7x + \left(\frac{7}{2}\right)^2 = 120 + \left(\frac{7}{2}\right)^2$ $\left(x + \frac{7}{2}\right)^2 = \frac{529}{4}$ $x + \frac{7}{2} = \sqrt{\frac{529}{4}} = \frac{23}{2}$ $x = 8$ Lengths of the perpendicular sides = 8 centimetre , 15 centimetre	
13(A)	(i) Yes . The sequence of natural numbers which leave an odd remainder on division by 6 are odd numbers. The sequence of odd numbers is an arithmetic sequence. [Numbers which leave 1 on division by 6 : 1 , 7 , 13 , 19 , . . . Numbers which leave 3 on division by 6 : 3 , 9 , 15 , 21 , . . . Numbers which leave 5 on division by 6 : 5 , 11 , 17 , 23 , . . . ∴ Natural numbers which leave an odd remainder on division by 6 = 1,3,5, 7,9,11. . .] (ii) $x_n = 2n + 1 - 2 = 2n - 1$ [$x_n = dn + f - d$] The sum of the first n numbers $= 2 \times \frac{n(n+1)}{2} - n = n^2$	2 1 2
13(B)	(i) $x_n = 3n + 4 - 3 = 3n + 1$ [$x_n = dn + f - d$] Sum of the first 10 numbers $= (3 \times \frac{10 \times 11}{2}) + 10 = 175$ (ii) $175 + 30 = 205$ (If we change each term of the first 10 terms of this sequence to the next term , we get the 10 consecutive terms from the 2nd to the 11th . That is , each term increase by 3 . So the sum of the 10 consecutive terms increase by 30.) (iii) Among any two consecutive terms of this sequence , one is even and the other is odd. So among any 10 consecutive terms , half are even and the other half are odd. Since the sum of 5 even numbers is even and the sum of 5 odd numbers is odd , the sum of any 10 consecutive terms of this sequence is odd. So the sum of any 10 consecutive terms can not be 500. Another method (i) $x_{10} = 4 + (9 \times 3) = 31$ Sum of the first 10 numbers $= \frac{10}{2} \times (4 + 31) = 175$ (ii) The sum of 10 consecutive terms from the 2nd to the 11th = Sum of the first 10terms $+ x_{11} - x_1$ $= 175 + (10 \times 3) = 205$	1 1 1 2

	(iii) The terms of this sequence got by adding 1 to the product of natural numbers by 3 . So the sum of any 10 consecutive terms of this sequence is 10 more than a multiple of 3 . We do not get 500 by adding 10 to a multiple of 3 . (Since 490 is not a multiple of 3) . So the sum of any 10 consecutive terms can not be 500. OR The terms of this sequence got by adding 1 to the product of natural numbers by 3 . So the sum of any 10 consecutive terms of this sequence is 10 more than a multiple of 3 . So the sum of any 10 consecutive terms of this sequence leave remainder 1 on division by 3 . But 500 leaves remainder 2 on division by 3 . So the sum of any 10 consecutive terms can not be 500. OR Among any two consecutive terms of this sequence , one is even and the other is odd. So among any any 10 consecutive terms , the sum of the 5th and the 6th terms must be an odd number. If the sum of the 10 consecutive terms is 500 , then the sum of the 5th and the 6th terms will be 100 . [Each pair sum $\frac{500}{5} = 100$] . This is not possible. So the sum of any 10 consecutive terms can not be 500.	
14	(i) $x_n = 4n + 6 - 4 = 4n + 2$ [$x_n = dn + f - d$] Sum of the first n terms $= 4 \times \frac{n(n+1)}{2} + 2n = 2n^2 + 4n$ (ii) $2n^2 + 4n = 880$ $n^2 + 2n = 440$ $n^2 + 2n + 1^2 = 440 + 1^2$ $(n+1)^2 = 441$ $n + 1 = \sqrt{441} = 21$ $n = 20$	1 1 1 1 1
	SECTION C	
15	(i) $\frac{1}{3}$ [$\frac{2}{6}$]	1
16	(iv) $p = q$ [$p = q = \frac{60}{360} = \frac{1}{6}$]	1
17	(i) Probability that the dot inside the circle $= \frac{Area\ of\ the\ triangle}{Area\ of\ the\ circl.e}$ $= \frac{\frac{1}{2} \times 2 \times 2}{\pi \times 2^2} = \frac{1}{2\pi}$ (ii) Area of the segment = Area of the sector – Area of the tringle $= \frac{1}{4} \times 4\pi - \frac{1}{2} \times 2 \times 2 = \pi - 2$ Probability that the dot inside the shaded segment of the circle $= \frac{Area\ of\ the\ segment}{Area\ of\ the\ circl.e} = \frac{\pi - 2}{4\pi}$	1 1 1

18	The smallest three digit number which leave remainder 3 on division by 4 $= 103$ The largest three digit number which leave remainder 3 on division by 4 $= 999$ $999 - 103 = 896 = 4 \times 224$ $\therefore$ The number of three digit numbers leave remainder 3 on division by 4 $= 225$ [In this arithmetic sequence , change in terms = 4 x change in position] Total number of three digit numbers $= 900$ $\therefore$ Probability $= \frac{225}{900}$	1 1 1 1
19(A)	Total number of pairs $= 6 \times 6 = 36$ (i) Number of required pairs $= 3 \times 3 = 9$ $\therefore$ Probability $= \frac{9}{36}$ (ii) Number of required pairs $= (3 \times 3) + (3 \times 3) = 9 + 9 = 18$ $\therefore$ Probability $= \frac{18}{36}$ (iii) Number of required pairs $= 3 \times 3 = 9$ $\therefore$ Probability $= \frac{9}{36}$	1 1 2 1
19(B)	Total number of pairs $= 35 \times 35 = 1225$ (i) Number of required pairs $= 15 \times 20 = 300$ $\therefore$ Probability that both are girls $= \frac{15 \times 20}{35 \times 35} = \frac{300}{1225}$ (ii) Number of required pairs $= (20 \times 20) + (15 \times 15) = 400 + 225 = 625$ Probability that one is a boy and the other is a girl $= \frac{625}{35 \times 35} = \frac{625}{1225}$ (iii) Probability that both are boys $= \frac{20 \times 15}{35 \times 35} = \frac{300}{1225}$ Probability that at least one is a boy = $= \frac{300}{1225} + \frac{625}{1225} = \frac{925}{1225}$ Another method (iii) Probability that at least one is a boy = 1 – Probability that both are girls $= 1 - \frac{300}{1225} = \frac{925}{1225}$	1 1 2 1
	SECTION D	
20	a. Outside the circle [$\angle Q + \angle S = 165^0$]	1
21	(iii) Both are true , B is the reason for A.	1
22	Central angle of the arc $= 2 \times 18^0 = 36^0$ This arc is $\frac{1}{10}$ of the circle. $\left[\frac{36}{360} = \frac{1}{10} \right]$	1 1

	That is , the length of this arc is $\frac{1}{10}$ of the circumference of the circle. $\therefore$ Length of the arc $= \frac{1}{10} \times 2\pi \times 10 = 2\pi \ cm$	1
23(A)	In the figure ABCD is a regular pentagon. [AB = BC = CD = DE = EA , $\angle A = \angle B = \angle C = \angle D = \angle E = \frac{540}{5} = 108^0$] Draw the diagonal BE . ABE is an isosceles triangle. . $\therefore \quad \angle AEB = \angle ABE = \frac{180^0 - 108^0}{2} = 36^0$ In the cyclic quadrilateral AFBE , $\angle F = 180^0 - \angle AEB = 180^0 - 36^0 = 144^0$  	1 1 2
23(B)	Join AD . Central angle of the arc APC $= 2 \times \angle D$ [The central angle of the arc of a circle is twice the angle made by joining the ends of the arc to any point on the alternate arc] Central angle of the arc BQD $= 2 \times \angle A$ In the right triangle of hypotenuse AD , $\angle A + \angle D = 90^0$  Central angle of the arc APC + Central angle of the arc BQD $= (2 \times \angle D) + (2 \times \angle A)$ $= 2(\angle D + \angle A)$ $= 2 \times 90^0 = 180^0$ Since the sum of the central angles of the arcs APC and BQD is 180^0 , they are joined together form a semicircle.	1 1 1 1
24(A)	In the figure CD is the diameter of the circle and AB is a chord parallel to it . $\therefore \quad \angle BDC = \angle ABD = 35^0$ (Alternate angles are equal) Join BC. $\angle CBD = 90^0$ (Angle in a semicircle) In the triangle BCD , $\angle C = 180^0 - (90^0 + 35^0) = 55^0$ In the cyclic quadrilateral ABCD , $\angle A = 180^0 - 55^0 = 125^0$ In the triangle ABD , $\angle ADB = 180^0 - (125^0 + 35^0) = 20^0$  	1 1 1 1

24(B)	In the figure, O is the centre of the circle. . Join OC . $\angle OAC = \angle OCA = x^0$ [OA = OC] The central angle of of the arc AC $= 2y^0$ [The central angle of the arc of a circle is twice the angle made by joining the ends of the arc to any point on the alternate arc] In the triangle AOC , $x + x + 2y = 180^0$ [Sum of the angles of a triangle] $2x + 2y = 180^0$ $x + y = \frac{180^0}{2} = 90^0$ 	1 1 1 1
25	$\angle BDC = \angle BAC = 35^0$ [The angles made by joining the ends of an arc of a circle to points on the alternate arc are equal] $\angle ACD = \angle ABD = 30^0$ $\angle CBD = \angle CAD = 45^0$ Since $\angle ABC = 45 + 30 = 75^0$, $\angle ADC = 180 - 75 = 105^0$ [ABCD is cyclic] $\therefore \angle ADB = 105 - 50 = 55^0$ $\angle ADB = \angle ACB = 55^0$ In the triangle APD , $\angle APD = 180 - (55 + 45) = 80^0$ Angles of the quadrilateral $= 75^0 , 85^0 , 105^0 , 95^0$ An angle between the diagonals $= 80^0$ OR 100^0 	1 1 1 1 1
26	For drawing the circle For drawing double the angles of the triangle at the centre of the circle . For completing the triangle. 	1 2 2