

SUMMATIVE ASSESSMENT – TERM I 2025 – 26

Class X

MATHEMATICS – ANSWER KEY

E-1003

Qn no	Key	Score
SECTION A		
1	16	1
2	C. Both the statements are true , statement 2 is the reason of statement 1.	1
3 (A)	4 , 10 , 16 , . . . Yes . It is an arithmetic sequence . . Because the number got by subtracting the previous term from a term of this sequence is the same (6) in this sequence.	1 1 1
3 (B)	1 , 3 , 5 , 7 , 9 , 1 , 3 , 5 , 7 , 9 . . . No .It is not an arithmetic sequence. Because the number got by subtracting the previous term from a term is not the same in this sequence	1 1 1
4	As the positions increase by 1 , the terms increase by 9 in this sequence . That is the change in terms is a multiple of 9 . [Change in terms = 9 x change in position] (i) $108 = 9 \times 12$. So the difference of two terms of this sequence can be 108. (ii) $15^{\text{th}} \text{ term} = 14 + (14 \times 9) = 140$ (iii) Change in terms = $230 - 14 = 216 = 9 \times 24$ Change in terms = 24 . So 230 is the 25^{th} term of this sequence.	1 1 1 1
5 (A)	As the positions increase by 2 , the terms decrease by 6 in this sequence . . (i) $5^{\text{th}} \text{ term} = 51 - 3 = 48$ (As the positions increase by 1 , the terms decrease by 3) (ii) $4 \times 3 = 12$ (iii) First term = $48 + 12 = 60$ First 3 terms = 60 , 57 , 54	1 1 1 1
5 (B)	(i) $4^{\text{th}} \text{ term} = \frac{133}{7} = 19$ (ii) $11^{\text{th}} \text{ term} = \frac{378}{7} = 54$ [Sum of the next 7 terms = $511 - 133 = 378$] (iii) As the positions increase by 7 , the terms increase by 35 in this sequence . (As the positions increase by 1 , the terms increase by 5) First term = $19 - (3 \times 5) = 4$ First 3 terms = 4 , 9 , 14	1 1 1 1
6	As the positions increase by 3 , the terms increase by 20 in this sequence (i) $2^{\text{nd}} \text{ term} = 42 - 20 = 22$ (ii) $14^{\text{th}} \text{ term} = 42 + (3 \times 20) = 102$ (iii) Sum of the first 18 terms = $9 \times (42 + 102) = 9 \times 144 = 1296$ $[x_1 + x_{18} = x_2 + x_{17} = . . . = x_5 + x_{14}]$	1 1 1 2

SECTION B

7	11	$(9^2 = 81)$	1
8	7	$(f = 5 + 2)$	1
9	<p>The terms of this sequence got by adding 2 followed by multiplying the natural numbers by 4.</p> $[x_n = 4n + 6 - 4 = 4n + 2]$ <p>That is , the terms of this sequence leave remainder 2 on division by 4 .</p> <p>Since any number which leaves remainder 2 on division by 4 is not a perfect square , this sequence does not contain any perfect square . [Any perfect square leaves remainder 0 or 1 on division by 4].</p>		1 1 1
10	<p>(i) Take the two consecutive multiples of 4 as x and $x + 4$, then</p> $x(x + 4) = 672 \implies x^2 + 4x = 672$ <p>(ii) $x^2 + 4x + 2^2 = 672 + 2^2 \implies (x + 2)^2 = 676$</p> $x + 2 = \sqrt{676} = 26$ $x = 24$ <p>\therefore Consecutive multiples of 4 = 24 , 28</p>		1 1 1
11	<p>(i) First term = $3 + 2 = 5$</p> <p>(ii) Sum of the first two terms = $(3 \times 2^2) + (2 \times 2) = 12 + 4 = 16$</p> <p>2nd term = $16 - 5 = 11$</p> <p>Common difference = 6</p> <p>(iii) $x_n = 6n + 5 - 6 = 6n - 1$ $[x_n = dn + f - d]$</p>		1 1 1 1
12(A)	<p>Take the length of the smaller side of the rectangle as x metres and the length of the larger side as $x + 8$ metres , then</p> <p>(i) $x(x + 8) = 180 \implies x^2 + 8x = 180$</p> <p>(ii) $x^2 + 8x + 4^2 = 180 + 4^2 \implies (x + 4)^2 = 196$</p> $x + 4 = \sqrt{196} = 14 \implies x = 10$ <p>Length of the sides = 10 metres , 18 metres</p> <p style="text-align: center;"><u>Another way</u></p> <p>Take the length of the smaller side of the rectangle as $x - 4$ metres and the length of the larger side as $x + 4$ metres, then</p> <p>(i) $(x + 4)(x - 4) = 180 \implies x^2 - 4^2 = 180$</p> <p>(ii) $x^2 - 16 = 180$</p> $x^2 = 196$ $x = \sqrt{196} = 14$ <p>Length of the smaller side = $14 - 4 = 10$ metres</p> <p>Length of the larger side = $14 + 4 = 18$ metres</p>		1 1 1 1
12(B)	<p>Take the lengths of the perpendicular sides of the right triangle are x centimetres and $x + 2$ centimetres , then</p> $\frac{1}{2} \times x(x + 2) = 24$ $x(x + 2) = 48$		1

	$x^2 + 2x = 48$ $x^2 + 2x + 1^2 = 48 + 1^2$ $(x + 1)^2 = 49$ $x + 1 = \sqrt{49} = 7$ $x = 6$ <p>Lengths of the sides = 6 centimetres , 8 centimetres and $\sqrt{6^2 + 8^2} = 10$ centimetres</p> <p style="text-align: center;"><u>Another way</u></p> <p>Take the lengths of the perpendicular sides of the right triangle are $x - 1$ centimetres and $x + 1$ centimetres , then $\frac{1}{2} \times (x - 1)(x + 1) = 24$</p> $(x - 1)(x + 1) = 48 \quad \implies \quad x^2 - 1^2 = 48$ $x^2 - 1 = 48$ $x^2 = 49$ $x = \sqrt{49} = 7$ <p>Length of the smaller perpendicular side = $7 - 1 = 6$ centimetres Length of the larger perpendicular side = $7 + 1 = 8$ centimetres Hypotenuse = $\sqrt{6^2 + 8^2} = 10$ centimetres</p>	1 1 1
13	<p>(i) First term = 105 , Last term = 994</p> <p>(ii) Change in terms = $994 - 105 = 889 = 7 \times 127$ [In this sequence ,Change in terms = $7 \times$ Change in position] 994 is the 128th term of this sequence. [Change in position = 127]</p> <p>\therefore Total number of three digit multiples of 7 = 128</p> <p>(iii) Sum = $\frac{128}{2} \times (105 + 994) = \frac{128}{2} \times 1099 = 70336$</p>	2 1 1 1
14(A)	<p>(i) $1 + 2 + 3 + \dots + 30 = \frac{30 \times 31}{2} = 465$</p> <p>(ii) $4 + 8 + 12 + \dots + 120 = 4(1 + 2 + 3 + \dots + 30) = 4 \times 465 = 1860$</p> <p>(iii) $1860 + (30 \times 1) = 1890$ $x_n = 4n + 1$ \therefore Sum of the first n terms = $4 \times \frac{n(n+1)}{2} + n = 2n^2 + 3n$</p>	1 1 1 1 1
14(B)	$x_n = 2n + 11 - 2 = 2n + 9$ [$x_n = dn + f - d$]	1
	<p>(i) Sum of the first n terms = $2 \times \frac{n(n+1)}{2} + 9n = n^2 + 10n$</p> <p>(ii) $n^2 + 10n = 600$ $n^2 + 10n + 5^2 = 600 + 5^2$ $(n + 5)^2 = 625$ $n + 5 = \sqrt{625} = 25$ $n = 20$</p>	1 1 1 1

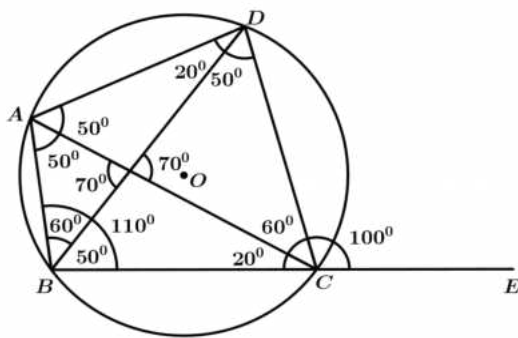
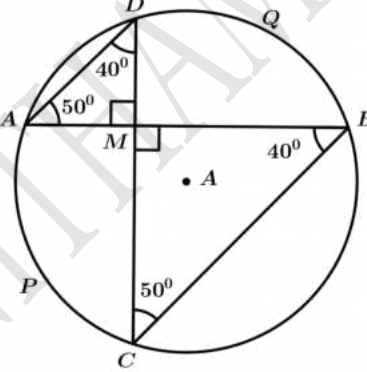
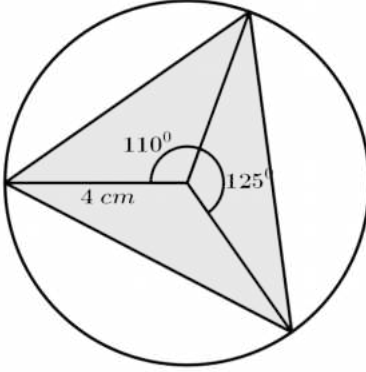
SECTION C

15	B. (i) and (iii) are true.	1
16	$\frac{4}{6}$ [Possible numbers : 527 ,572 ,725 ,752]	1
17	(i) Probability = $\frac{5}{10} = \frac{1}{2}$ $\left[\frac{1}{2} = \frac{15}{30} \right]$	1
	(ii) Probability = $\frac{7}{15}$ $\left[\frac{7}{15} = \frac{14}{30} \right]$	1
	Playing with the first game board gives better chance to win .	1
18	(i) Probability = $\frac{60}{360} = \frac{1}{6}$	1
	(ii) $x = \frac{4}{9} \times 360 = 160^\circ$	1
	(iii) Central angle of the shaded sector = $360 - 60 - 160 = 140^\circ$ Probability = $\frac{140}{360} = \frac{7}{18}$	1
19(A)	Number of two digit numbers = $29 - 9 = 20$	1
	(i) Required numbers = 10 , 15 , 20 , 25 \therefore Probability = $\frac{4}{20} = \frac{1}{5}$	1
	(ii) Required numbers = 14 , 23 \therefore Probability = $\frac{2}{20} = \frac{1}{10} = 0.1$	2
	(iii) Required numbers = 10 , 13 , 22 , 18 , 27 \therefore Probability = $\frac{5}{20} = \frac{1}{4}$	1
19(B)	(i) Number of possible pairs = $25 \times 40 = 1000$	1
	(ii) Number of required pairs = $10 \times 15 = 150$ Probability of both being black = $\frac{10 \times 15}{25 \times 40} = \frac{150}{1000}$	1
	(iii) Probability of getting at least one white = $1 - \text{Probability of both being black}$ $= 1 - \frac{150}{1000} = \frac{850}{1000}$	1
	(iv) Probability of one being black and the other being white $= 1 - \text{Probability of both being black} - \text{Probability of both being white}$ $= 1 - \frac{150}{1000} - \frac{15 \times 25}{1000} = 1 - \frac{150}{1000} - \frac{375}{1000} = \frac{475}{1000}$	2
	<u>Another way</u>	
	(iii) Number of required pairs = $(10 \times 25) + (15 \times 15) + (15 \times 25) = 850$ Probability of getting at least one white = $\frac{850}{1000}$	
	(iv) Number of required pairs = $(10 \times 25) + (15 \times 15) = 475$	

$$\text{Probability of one being black and the other being white} = \frac{475}{1000}$$

SECTION D

20	C		1
21	(iv) Both the statements are true , statement 2 is not the reason of statement 1.		1
22	<p>(i) $\angle ADB = \frac{130}{2} = 65^\circ$</p> <p>[The angle made by joining the ends of an arc of a circle to any point on the alternate arc is half the central angle of the arc]</p> <p>(ii) $\angle BDC = \frac{50}{2} = 25^\circ$</p> <p>(iii) $\angle BPC = 180 - 25 = 155^\circ$</p> <p>[DBPC is a cyclic quadrilateral , $\angle BPC + \angle BDC = 180^\circ$]</p>		1 1 1
23(A)	<p>(i) $\angle POR = 2 \times 70 = 140^\circ$</p> <p>[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]</p> <p>(ii) $\angle PSR = 180 - 140 = 40^\circ$ [ORSP is a cyclic quadrilateral , $\angle POR + \angle S = 180^\circ$]</p> <p>(iii) $\angle PCR = 2 \times 40 = 80^\circ$</p>		1 1 1
23(B)	<p>Draw the lines AB , BP and BQ .</p> <p>$\angle ABP = 90^\circ$ [ABP is a semicircle ,AP is the diameter , Angle in a semicircle is 90°]</p> <p>$\angle ABQ = 90^\circ$ [ABQ is a semicircle ,AQ is the diameter]</p> <p>B is point on the line PQ .</p> <p>[$\angle ABP + \angle ABQ = 180^\circ$]</p>		1 1 1
24(A)	<p>(i) $\angle BCE = 180 - 30 - 20 = 130^\circ$ [Sum of the angles of a triangle is 180°]</p> <p>(ii) $\angle ADB = 50^\circ$ [$\angle ACB = \angle ADB = 50^\circ$</p> <p>[In a circle , the angles made by joining the ends of the arc to the points on the alternate arc are the same]</p> <p>(iii) $\angle DAB = 90^\circ$ [ABD is a semicircle , BD is the diameter , Angle in a semicircle is 90°]</p> <p>(iv) $\angle ABD = 180 - 90 - 50 = 40^\circ$</p> <p>[Sum of the angles of a triangle is 180°]</p>		1 1 1 1

24(B)	<p>(i) $\angle BDC = 50^\circ$ [$\angle BAC = \angle BDC = 50^\circ$ [In a circle , the angles made by joining the ends of the arc to the points on the alternate arc are the same]</p> <p>(ii) $\angle ACB = 20^\circ$ [$\angle ADB = \angle ACB = 20^\circ$]</p> <p>(iii) $\angle ABC = 180 - 70 = 110^\circ$ [ABCD is a cyclic quadrilateral , $\angle ABC + \angle ADC = 180^\circ$]</p> <p>(iv) $\angle DCE = 100^\circ$</p>		1 1 1 1
25	<p>(i) $\angle BCD = 50^\circ$ [$\angle ADC = \angle ABC = 40^\circ$ [In a circle , the angles made by joining the ends of the arc to the points on the alternate arc are the same , $\angle BMC = 90^\circ$]</p> <p>(ii) Central angle of the arc APC = $2 \times 40^\circ = 80^\circ$ [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]</p> <p>Central angle of the arc BQD = $2 \times 50^\circ = 100^\circ$ Central angle of the arc APC + Central angle of the arc BQD = $80 + 100 = 180^\circ$ Since the sum of the central angles of the arcs APC and BQD is 180° , they are joined together form a semicircle. .</p>		1 1 1 1
26	<p>For drawing the circle</p> <p>For drawing double the angles of the triangle at the centre of the circle .</p> <p>For completing the triangle.</p>		1 2 2