

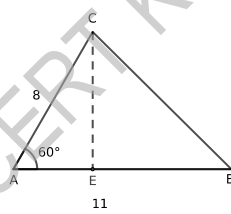
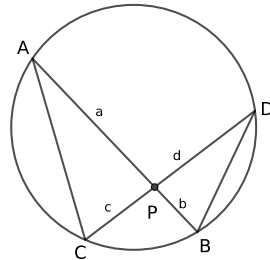
SUMMATIVE ASSESSMENT - III 2025 – 26
ANSWER KEY
MATHEMATICS

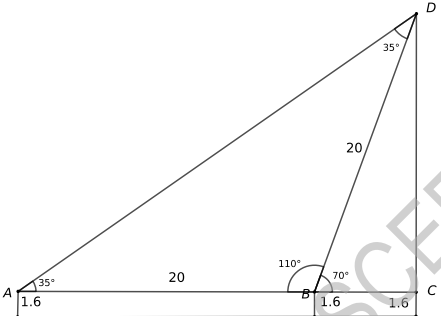
SET B

Qn No			Score	Answer/ Value points	Further information
				Section A	
1			1	C) 48	
2			1	A) $\frac{1}{2}$	
3			1	D) 1	
4			1	D	
5			1	A) (0,0), (4,0)	
6			1	B) (ii) and (iii) are correct	
7			1	C	
8			1	C	
				Section B	
9			1	The sum of two odd numbers and the sum of two even numbers is an even number. The sum of an odd number and even number is an odd number.	
			1	Therefore in an arithmetic sequence with an even common difference, if one term is an odd number, then all the terms will be odd numbers.	
			1	If the common difference is an odd number, the next term of this number is an even number, and the next term is an odd number. Therefore in an arithmetic sequence where all terms are natural numbers, only one term cannot be an odd number.	
10	A		1	6 common difference = $30 - 10 = 20$	
			1	23 rd terms = $30 + 2 \times 20 = 70$	
			1	Sum of first 27 terms = $\frac{27}{2}(5\text{th term} + 23\text{rd term})$ $= \frac{27}{2}(10 + 70) = 27 \times 40 = 1080$ (Give $\frac{1}{2}$ Score for the idea sum of first 27 terms = $\frac{27}{2}(5\text{th term} + 23\text{rd term})$ alone is correct)	
	B		1	11 th term = $\frac{50}{2} = 25$	
			1	13 th term = $25 + 2 \times 3 = 31$	
			1	Sum of first 25 terms = $31 \times 25 = 775$ (Give $\frac{1}{2}$ Score for the idea sum of first 25 terms = middle term $\times 25$)	
11			1	No of two digit numbers that are multiples of 3 = 30	
			1	Probability that this number is an odd number = $\frac{15}{30} = \frac{1}{2}$	

12	A		(Give $\frac{1}{2}$ Score for the idea $\frac{15}{30}$)													
		1	Probability that this number is a multiple of 6 = $\frac{1}{2}$ (Multiples of 6 are even multiples of 3)													
		1	Probability that this number is a multiple of 9 = $\frac{1}{3}$ (No of multiples of 9 is $\frac{1}{3}$ rd of no of multiples of 3)													
	B	1	(i) For the product being prime, the possible pairs are (1,2), (1,3), (1,5), (1,7), (2,1), (3,1), (5,1), (7,1) or 8 possible pairs													
		1	No of pairs = $10 \times 10 = 100$ Probability that the product being prime = $\frac{8}{100}$ or $\frac{2}{25}$ (Give 1 score if total no of pairs = 100 alone is correct)													
		1	(ii) For the product being power of 2, the possible pairs are (1,2), (1,4), (1,8), (2,1), (2,2), (2,4), (2,8), (4,1), (4,2), (4,4), (4,8), (8,1), (8,2), (8,4), (8,8)													
		1	Probability that the product being power of 2 = $\frac{15}{100} = \frac{3}{20}$													
			<table><tr><th>Daily wages</th><th>No of workers</th></tr><tr><td>Less than 600</td><td>10</td></tr><tr><td>Less than 700</td><td>32</td></tr><tr><td>Less than 800</td><td>52</td></tr><tr><td>Less than 900</td><td>67</td></tr><tr><td>Less than 1000</td><td>75</td></tr></table>	Daily wages	No of workers	Less than 600	10	Less than 700	32	Less than 800	52	Less than 900	67	Less than 1000	75	
	Daily wages	No of workers														
	Less than 600	10														
Less than 700	32															
Less than 800	52															
Less than 900	67															
Less than 1000	75															
1	(i) Median wage is the wage of 38 th worker															
1	(ii) Median class 700 – 800															
1	(iii) $\frac{100}{20} = 5$; wage of 33 rd worker = $700 + \frac{5}{2} = 702\frac{1}{2}$															
1	wage of 38 th worker = $700 + \frac{5}{2} + 5 \times 5$															
1	Median = $725 + \frac{5}{2} = 727\frac{1}{2}$ (Give 1 Score if cumulative frequency table alone is correct)															
		Section C														
13		y coordinate is 0														
	1	change in x coordinate and change in y coordinates are same.														
		1	x coordinate is $1+2 = 3$ coordinates of P is (3,0). (Give $\frac{1}{2}$ Score if y coordinate alone is correct)													
14	(i)	1	For drawing x and y axis													
		1	For marking any one point correctly													
		1	For marking other two points correctly													
	(ii)	1	For drawing parallelogram correctly													
		1	For writing the coordinates – any one of (6,4); (-2,4); (4,0)													

15	A	(i)	1	A(5,0); B(0,3)	
			1	Slope = $\frac{3-0}{0-5} = -\frac{3}{5}$	
		(ii)	1	$(y-3) = -\frac{3}{5}(x-0)$	
			1	$5(y-3) = -3x; 5y-15 = -3x;$ Equation of the line is $3x+5y-15=0$	
		(iii)	1	Circumcentre is the mid point of hypotenuse coordinates $\left(\frac{5}{2}, \frac{3}{2}\right)$	
	B	(i)	1	Coordinates of centre = $\left(\frac{-1+7}{2}, \frac{2+8}{2}\right) = (3,5)$	
			1	Radius = $\sqrt{(7-3)^2 + (8-5)^2} = 5$	
		(ii)	1	Equation of the circle $(x-3)^2 + (y-5)^2 = 25$	
			1	For substituting the values as x=0 and y=1 $(0-3)^2 + (1-5)^2$	
		(iii)	1	Equation satisfies, So (0,1) is a point on the circle.	
				Section D	
16	A	(i)	1	$1+2+3+ \dots +20 = \frac{20 \times 21}{2} = 210$	
		(ii)	1	$3+6+9+ \dots + 60 = 3 \times 210 = 630$	
		(iii)	1	Sum of first 20 terms = $630 + 20 \times 2 = 670$	
	B	(i)	1	First term = $3 \times 1^2 + 1 = 4$ Sum of first two terms = $3 \times 2^2 + 2 = 14$	
		(ii)	1	Second term = $14 - 4 = 10$ Common difference = $10 - 4 = 6$ (Give 1 Score if only first term and common difference are correct)	
			1	Algebraic form is $x_n = 6n - 2$	
17			1	Length + breadth = 40, Sides $20 - x, 20 + x$ (Give $\frac{1}{2}$ Score if length+breadth = 20 alone is correct)	
			1	$(20+x)(20-x) = 396;$ $400 - x^2 = 396$	
			1	$x^2 = 4; x = \pm 2$, Sides 22,18	
18		(i)	1	$x_n = 4n+3$	
		(ii)	1	Natural numbers can be written as $4n, 4n+1, 4n+2, 4n+3$ The square of any multiple of 4 is again a multiple of 4, not a term in this sequence.	
			1	$(4n+1)^2 = (4n)^2 + 2 \times 4n \times 1 + 1 =$ multiple of 4+1, leaves remainder 1 on division by 4, not a term in this sequence.	
			1	$(4n+2)^2 =$ multiple of 4 + 1 and $(4n+3)^2 =$ multiple of 4 + 1, both leaves remainder 1 on division by 4, not a term in this sequence. So no perfect square is a term of this sequence.	

19		(i)	1	$a+b = 1; ab = -56$	
			1	$a=8, b= -7$	
			1	$x^2 + x + 56 = (x + 8)(x - 7)$ (Give 1 Score if only one factor is correct)	
		(ii)	1	At the point of intersection $x^2 + x + 56 = (x + 8)(x - 7) = 0$	
			1	$x = -8$ or 7 the point of intersection is $(-8,0), (7,0)$ (Give $\frac{1}{2}$ Score for the concept, at the point of intersection y coordinates are zero)	
				Section E	
20			1	This is a right triangle, Area = $\frac{1}{2} \times 8 \times 15 = 60$	
			1	Inradius = $\frac{60}{20} = 3\text{cm}$	
21		(i)	1	In right triangle AEC, angles are in the ratio $1:\sqrt{3}:2$ or $AE = 4$	
			1	Height = $4\sqrt{3}$	
		(ii)	1	Area = $\frac{1}{2} \times 11 \times 4\sqrt{3} = 22\sqrt{3} \text{ sq.cm}$	
22	A	(i)	1	$\angle C = 45^\circ, \angle D = 90 + 45 = 135^\circ$ (Give $\frac{1}{2}$ Score if any one angle is correct)	
		(ii)	1	$\angle B + \angle D = 90 + 135 = 225 > 180$	
			1	D is inside the circle.	
	B	(iii)	1	$\angle A + \angle C = 90 + 45$ or $360 - 225 = 135^\circ < 180$, so A is out side the circle.	
		(i)	1	Sum of length of one pair of opposite sides = $4+4 = 8\text{cm}$ Sum of length of parallel sides = 8cm	
		(ii)	1	Sum of other two angles of triangle = $180-100 = 80$	
			1	OA and OB are the angle bisectors. So in trapezium $\angle A + \angle B = 2 \times 80 = 160^\circ$	
			1	Base angles of isosceles trapezium are equal. $\angle A = \frac{160}{2} = 80^\circ, \angle C = 180 - 80 = 100^\circ$ (Give $\frac{1}{2}$ Score if any one angle is correct)	
23		(i)	1	Being angles in a segment, the top angles of the triangles are equal, the bottom angles of the triangles are equal.	
			1	Length of sides opposite to equal angles are scaled by same factor. $a=kd, c=kb$	

24			1	$k = \frac{a}{d}, c = \frac{a}{d} \times b$ $cd = ab \Rightarrow PA \times PB = PC \times PD$	
		(ii)	1	Length of two parts of diameter = $8+3, 8-3 = 11, 5$	
			1	Half of chord = $\sqrt{11 \times 5} = \sqrt{55}$	
			1	Length of chord = $2 \times \sqrt{55}$	
	A	(i)	1	For drawing rough figure and marking the given measures	
					
		(ii)	1	In triangle ADB, $\angle ADB = \angle DAB = 35^\circ$, $BD=AB=20$	
			1	In triangle BCD, $h = 20 \times \sin 70^\circ$ or 20×0.9397	
			1	Height of tree = $18.79 + 1.6 = 20.39$ m	
			1	Width of the river, $x = 20 \times \cos 70^\circ$ or $20 \times 0.3420 = 6.84$ m	
	B	(i)	1	$\angle A = 75^\circ$, $2r \sin 75^\circ = 6$ or $2r \times 0.97 = 6$ (Give $\frac{1}{2}$ Score if $\angle A = 75^\circ$ alone is correct)	
			1	Diameter $2r = \frac{6}{0.97} = 6.19$ cm	
		(ii)	1	$AB = 6.19 \times \sin 50$ or 6.19×0.7660	
			1	$AB = 4.7$ cm	
			1	$AC = 6.19 \times \sin 55$ or $6.19 \times 0.8192 = 5.1$	
25	A		1	Height of square pyramid and cone are 12 centimetres each.	
			1	Base edge of square pyramid, diameters of cone and sphere are 12 centimetres each	
			1	Volume of square pyramid = $\frac{1}{3} \times 12^2 \times 12 = 576$ cubic centimetres.	
			1	Volume of cone = $\frac{1}{3} \pi \times 6^2 \times 12 = 144\pi$ cubic centimetres.	
			1	Volume of sphere = $\frac{4}{3} \pi \times 6^3 = 288\pi$ cubic centimetres.	
	(i)		1	Slant height = 18	
				Radius of the cone is $\frac{120}{360} = \frac{1}{3}$ part of radius of the circle.	

		1	Radius of cone = $18 \times \frac{1}{3} = 6$ cm	
		1	Curved Surface area = $\pi \times 6 \times 18 = 108\pi$ square centimetres. Or Curved Surface area = $\frac{1}{3} \times \pi \times 18^2 = 108\pi$	
B	(ii)	1	Curved surface area of cone is the area of the sector. 120 is $\frac{1}{3}$ part of 360. Therefore area of sector is $\frac{1}{3}$ part of area of circle	
		1	Radius of cone is $\frac{1}{3}$ part of radius of circle. Therefore base area is $\frac{1}{9}$ part of area of circle. Therefore curved surface area is 3 times base area	
		1	Or If radius of circle is r, then slant height is r and base radius is $\frac{r}{3}$	
		1	base area = $\pi \times \left(\frac{r}{3}\right)^2 = \frac{1}{9}\pi r^2$	
		1	Curved surface area = $\frac{1}{3}\pi r^2 = 3 \times \frac{1}{9}\pi r^2$	
26		1	For drawing circle of radius 3 centimetres	
		1	For calculating central angles (110°, 130°)	
		1	For drawing triangle.	
27		1	For drawing triangle with given measures	
		1	For drawing any one angle bisector.	
		1	For finding circum centre.	
		1	For finding radius and drawing circle.	