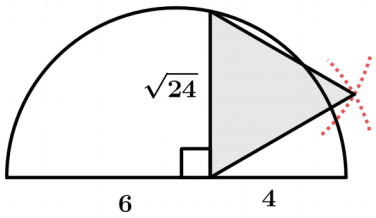
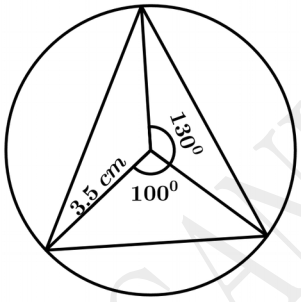
FIRST TERM EVALUATION 2024 - 2025

A | **MATHEMATICS EM – ANSWER KEY** | **E-1003**

Qn no.	Key	Score	
	Each questions from 1 to 4 carries 2 scores. (Answer any 3)		
1	a) $d = 4$ b) $x_{11} = 3 + 10 \times 4 = 43$	1 1	2
2	a) $\angle ADC = 180^0 - 110^0 = 70^0$ b) $\angle AOC = 2 \times 70^0 = 140^0$	1 1	2
3	a) 16 b) $\frac{2}{16} = \frac{1}{8}$	1 1	2
4	If the number is taken as x , then $(x - 3)^2 = 81$ $x - 3 = 9$ OR $x - 3 = -9$ $x = 9 + 3 = 12$ OR $x = -9 + 3 = -6$	 1 1	2
	Each questions from 5 to 10 carries 3 scores. (Answer any 4)		
5	a) $AC = 4\,cm$ b) $BC = 2\sqrt{3}\,cm$ Perimeter $= 4 + 2 + 2\sqrt{3} = 6 + 2\sqrt{3}\,cm$	1 1 1	3
6	a) $d = \frac{66 - 48}{13 - 7} = \frac{18}{6} = 3$ b) $x_{10} = x_7 + 3d = = 48 + 3 \times 3 = 57$ [OR, $x_{10} = x_{13} - 3d = = 66 - 3 \times 3 = 57$]	2 1	3
7	a) $PC = \sqrt{24}$ [$PA \times PB = PC^2$] b) For drawing a semicircle of diameter 10 cm . For completing the equilateral triangle .  	1 1 1	3
8	If the numbers are taken as n and $n + 2$, then a) $n(n + 2) = 143$ ===> $n^2 + 2n = 143$ $n^2 + 2n + 1^2 = 143 + 1^2$ ===> $(n + 1)^2 = 144$ $n + 1 = 12$ ===> $n = 11$ ===> Numbers $= 11$, 13	1 1 1	3

WINDOR GANITHAM

9	a) $\frac{30 \times 31}{2} = 465$ b) $4 \times 465 = 1860$ c) $1860 - 30 \times 3 = 1770$	1 1 1	3
10	If the radius of the smaller circle $= r$, then the radius of the larger circle $= 2r$ Probability $= \frac{Area\ of\ the\ smaller\ circle}{Area\ of\ the\ larger\ circle} = \frac{\pi \times r^2}{\pi \times (2r)^2} = \frac{\pi r^2}{4\pi r^2} = \frac{1}{4}$	1 2	3
	Each questions from 11 to 21 carries 4 scores. (Answer any 8)		
11	a) $\angle AOB = 2 \times 50^0 = 100^0$ b) For drawing the circle For taking angles at the centre of the circle of measures double the angles of the triangle For completing the triangle. 	1 1 1 1	4
12	a) $x_1 + x_{29} = 126$ b) $x_{15} = \frac{126}{2} = 63$ c) Sum $= 29 \times x_{15} = 29 \times 63 = 1827$	1 1 2	4
13	a) Length + Breadth $= \frac{120}{2} = 60\,cm$ b) If length $= 30 + x$, then breadth $= 30 - x$ $(30 + x)(30 - x) = 896$ ===> $30^2 - x^2 = 896$ c) $x^2 = 900 - 896 = 4$ ===> $x = \sqrt{4} = 2$ Length $= 32\,cm$, Breadth $= 28\,cm$ **[Another method :** b) If length $= x$, then breadth $= 60 - x$ $x(60 - x) = 896$ ===> $60x - x^2 = 896$ ===> $x^2 - 60x = -896$ c) $x^2 - 60x + 30^2 = -896 + 30^2$ ===> $(x - 30)^2 = -896 + 900 = 4$ $x - 30 = \sqrt{4} = 2$ ===> $x = 32$ Length $= 32\,cm$, Breadth $= 60 - 32 = 28\,cm$	1 1 1 1 1 1 1	4

WANDOOR GANITHAM

14	a) $\angle ABC = 65^0$ b) $\angle AEC = 65^0$ c) $\angle BCE = 25^0$ d) $\angle DAE = 180^0 - 125^0 = 55^0$	1 1 1 1	4
15	a) Number of yellow balls $= 24$ Probability of the ball being yellow $= \frac{24}{36} = \frac{2}{3}$ b) Probability $= \frac{1}{2}$ ==> Number of yellow balls = Number of blue balls Number of blue balls $= 12 + 12 = 24$	1 1 1 1	4
16	a) Length of a side $= \frac{68}{4} = 17\,cm$ b) $\sin 40^0 = \frac{DE}{17}$ $DE = 17 \times 0.643\,cm$ c) Area $= AB \times DE = 17 \times 17 \times 0.643\,sq.cm$	1 1 1 1	4
17	a) $d = 5$ b) Sequence $= 3, 8, 13, \ldots$ Remainder $= 3$ c) $2024 = 5 \times 404 + 4$ 2024 is not a term of this sequence . 2024 does not give remainder 3 on division by the common difference (5) . (Remainder got is 4)	1 1 1 1	4
18	a) $\angle DAB = 30^0$ b) In right triangle APD , $PD = \frac{6}{2} = 3\,cm$ c) In right triangle APD , $PA = 3\sqrt{3}\,cm$. ==> $AB = 2 + 3\sqrt{3}\,cm$ In right triangle BPD , $PC = 2\sqrt{3}\,cm$ ==> $CD = 3 + 2\sqrt{3}\,cm$	1 1 1 1	4
19	a) First term $= 1 + 12 = 13$ b) $d = 2$ c) $n^2 + 12n = 364$ ==> $n^2 + 12n + 6^2 = 364 + 6^2$ $(n + 6)^2 = 364 + 4 = 400$ ==> $n + 6 = \sqrt{400} = 20$ ==> $n = 14$	1 1 1 1	4
20	a) $TQ = 10 - 6 = 4\,cm$ b) $TP \times TQ = TR \times TS$ (OR , $TP \times TQ = 10 \times 4 = 40$) c) $TR \times TS = TP \times TQ$ ==> $TR \times 5 = 10 \times 4$ ==> $TR = 8\,cm$ $RS = 8 - 5 = 3\,cm$	1 1 1 1	4
21	a) First term $= 101$ b) Last term $= 398$	1 1	

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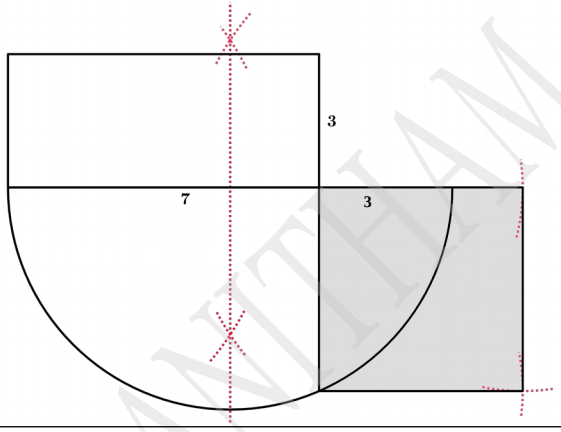
	c) $\textit{Position difference} = \dfrac{\textit{Term difference}}{\textit{Common difference}}$ ==> $n-1 = \dfrac{398-101}{3} = \dfrac{297}{3} = 99$ ==> $n = 100$ d) Sum $= \dfrac{100}{2} \times (101 + 398) = 24950$	1 1	4
	Each questions from 22 to 29 carries 5 scores. (Answer any 6)		
22	For drawing the rectangle . For drawing the semicircle / circle . For drawing the side of the square perpendicular to the diameter . For Completing the square . 	1 1 1 2	5
23	a) $45 \times 50 = 2250$ b) $\dfrac{20 \times 35}{2250} = \dfrac{700}{2250}$ c) $\dfrac{25 \times 15}{2250} = \dfrac{375}{2250}$ d) $1 - \dfrac{700}{2250} = \dfrac{1550}{2250}$ [OR , $\dfrac{25 \times 15}{2250} + \dfrac{25 \times 35 + 20 \times 15}{2250} = \dfrac{1550}{2250}$]	1 1 1 1 1	5
24	a) $x_5 = \dfrac{225}{9} = 25$ b) $x_{11} = \dfrac{372 - 225}{3} = \dfrac{147}{3} = 49$ $(S_{12} - S_9 = x_{10} + x_{11} + x_{12})$ c) $d = \dfrac{49 - 25}{11 - 5} = \dfrac{24}{6} = 4$ d) Sum $= 21 \times x_{11} = 21 \times 49 = 1029$	1 2 1 1	5
25	a) $PA = 22 - 6 = 16\,cm$ b) $PD = 20 - x$ c) $PC \times PD = PA \times PB$ ==> $(20 - x)\,x = 6 \times 16$ ==> $20x - x^2 = 96$ $x^2 - 20x = -96$ ==> $x^2 - 20x + 10^2 = -96 + 10^2$ ==> $(x - 10)^2 = 4$ $x - 10 = \sqrt{4} = 2$ ==> $x = 12$ ==> $PC = 12\,cm$, $PD = 8\,cm$	1 1 1 1 1	5

VANDOOR GANITHAM

26	**a)** $d = 6$	1	
	b) $x_n = dn + f - d = 6n + 7 - 6 = 6n + 1$	1	
	c) $6n + 1 = 97 \implies n = \frac{96}{6} = 16$	2	5
	d) Sum $= \frac{16}{2} \times (7 + 97) = 832$	1	
27	**a)** $\angle ODB = 20^0$	1	
	b) $\angle BOD = 180^0 - (20^0 + 20^0) = 140^0$	1	
	c) $\angle BAC = \frac{60^0}{2} = 30^0$	1	5
	d) $\angle BCD = 110^0$	1	
	e) $\angle COD = 80^0$	1	
28	**a)** $x + 5$	1	
	b) $\frac{1}{2} \times x(x + 5) = 52 \implies x^2 + 5x = 104 \implies x^2 + 5x - 104 = 0$	1	
	c) $x = \frac{-5 \pm \sqrt{5^2 - 4 \times 1 \times (-104)}}{2 \times 1} = \frac{-5 \pm \sqrt{25 + 416}}{2} = \frac{-5 \pm \sqrt{441}}{2} = \frac{-5 \pm 21}{2}$	1	5
	$x = \frac{16}{2} = 8$	1	
	Length of the perpendicular sides $= 8\,cm$, $13\,cm$	1	
29	**a) Pentagon**	1	
	b) $10 - 3 = 7$	1	
	c) $\frac{12 \times 9}{2} = 54$	1	5
	d) $n - 3$	1	
	e) $\frac{n(n-3)}{2}$	1	

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