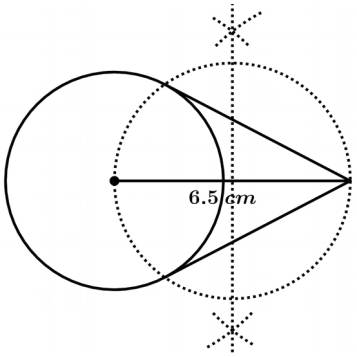
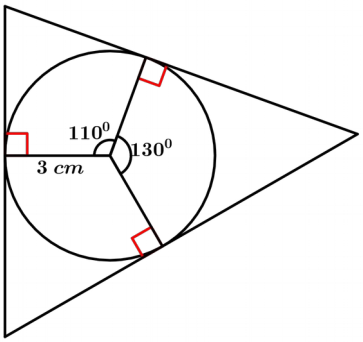
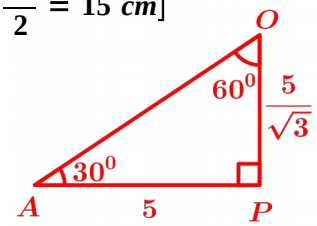
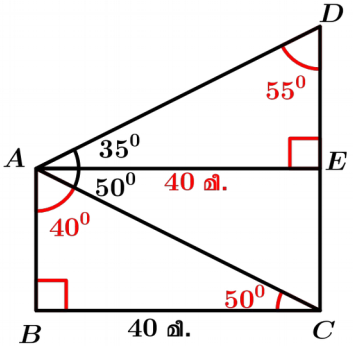
SECOND TERMINAL EVALUATION 2024 - 2025

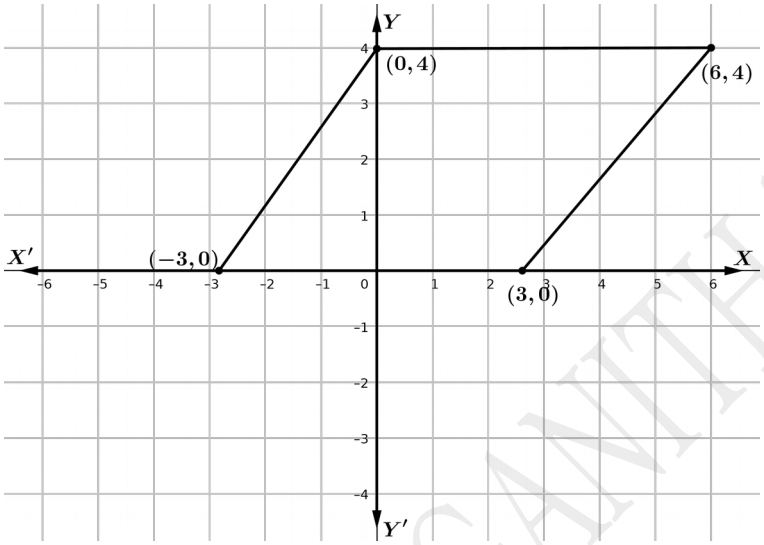
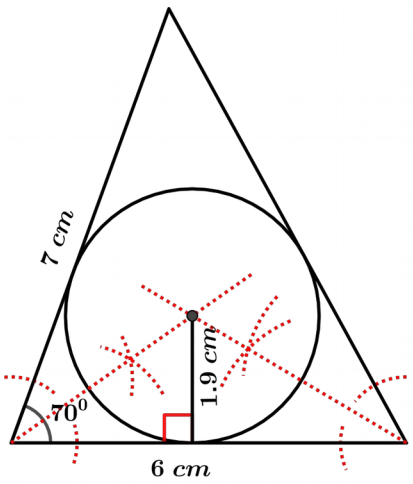
A | **MATHEMATICS EM – ANSWER KEY** | **E-1003**

Qn no.	Key	Score	
	Each questions from 1 to 4 carries 2 scores. (Answer any 3)		
1	a) $x_{10} = 50$ b) 25	1 1	2
2	a) $(6\ ,\ 0)$ b) Distance $= 5 - 1 = 4$	1 1	2
3	a) $\angle APB = 40^0$ b) $\angle PAB = \frac{180^0 - 40^0}{2} = 70^0$ $\quad [\because\ PA = PB]$	1 1	2
4	a) 8 b) $\frac{72}{8} = 9\ cm$	1 1	2
	Each questions from 5 to 10 carries 3 scores. (Answer any 4)		
5	Total number of pairs $= 5 \times 3 = 15$ a) Probability that both numbers are equal $= \frac{3}{15} = \frac{1}{5}$ $\quad [\because (1,1),(2,2),(3,3)]$ b) Probability that both numbers are prime $= \frac{6}{15} = \frac{2}{5}$ $[\because (2,2),(2,3),(3,2),(3,3),(5,2),(5,3)]$	1 1 1	3
6	a) $CD = 3\ cm$ b) $AD = 3\sqrt{3}\ cm.$, $BD = 3\ cm$ $AB = 3\sqrt{3} + 3\ cm$	1 1 1	3
7	Coordinates of B $= (2 + 5\ ,\ 3) = (7,\ 3)$ Coordinates of D $= (2\ ,\ 3 + 5) = (2,\ 8)$ Coordinates C $= (7,\ 8)$	1 1 1	3
8	For drawing a circle of radius 3 cm and mark a point 6.5 cm away from its centre . For drawing the perpendicular bisector of this 6.5 cm long line and drawing the large circle. For drawing tangents . 	1 1 1	3

9	a) $h = \sqrt{26^2 - 10^2} = \sqrt{36 \times 16} = 24\ cm$ b) Volume $= \frac{1}{3} \times 20^2 \times 24 = 3200\ cubic.cm$	1 2	3
10	a) $PR = \frac{12^2}{8} = 18\ cm$ $[\because PR \times PS = PQ^2]$ b) $RS = 18 - 8 = 10\ cm$ c) Radius $= \frac{RS}{2} = 5\ cm$	1 1 1	3
	Each questions from 11 to 21 carries 4 scores. (Answer any 8)		
11	a) First number $= x$ ===> Next term $= x + 2$ b) $x(x + 2) + 8 = 128$ ===> $x^2 + 2x + 8 = 128$ c) $x^2 + 2x + 1 = 121$ ===> $x^2 + 2x + 1^2 = 121$ ===> $(x + 1)^2 = 11^2$ $x + 1 = 11$ ===> $x = 10$ ===> Numbers $= 10, 12$	1 1 1 1	4
12	a) $\angle ADC = 90^0$ [∵ Angle in a semicircle] b) $\angle AOB = 140^0$ $[\because OA = OB, \angle OAB = \angle OBA]$ c) $\angle ADB = \frac{140^0}{2} = 70^0$ [∵ Angle on the alternate arc of an arc is half its central angle] d) $\angle ACD = 70^0$ $[\because \angle ADB = \angle ABD, \angle ACD = \angle ABD]$.	1 1 1 1	4
13	a) $\angle A = 180^0 - (40^0 + 75^0) = 65^0$ b) Diameter of the circumcircle $= \frac{7}{\sin 65^0} = \frac{7}{0.91}\ cm$ c) $AB = \frac{7}{0.91} \times 0.97\ cm$ $[\because \frac{AB}{\sin 75^0} = 2r]$ d) $AC = \frac{7}{0.91} \times 0.64\ cm$ $[\because \frac{AC}{\sin 40^0} = 2r]$	1 1 1 1	4
14	a) $AB = 7 - (-1) = 8$ $BC = \sqrt{(3-7)^2 + (5-2)^2} = \sqrt{25} = 5$ $AC = \sqrt{[3-(-1)]^2 + (5-2)^2} = \sqrt{25} = 5$ b) Isosceles triangle	1 1 1 1	4
15	For drawing a circle of radius 3 cm. For drawing supplementary angles of the angles of the triangle at the centre of the circle For drawing tangents to complete the triangle	1 1 2	4

			
16	a) Slant height $= 18\ cm$ b) $\frac{140}{360} = \frac{r}{18}$ $r = \frac{140 \times 18}{360} = 7\ cm$ c) Curved surface area $= \pi \times 7 \times 18 = 126\pi\ sq.cm$ [OR , Curved surface area of the cone = Area of the sector $= \frac{140}{360} \times \pi \times 18^2 = 126\pi\ sq.cm$]	1 1 1 1	4
17	a) $AC = \frac{13}{5} \times 5 = 13\ cm$ $[\because \sin A = \frac{BC}{AC}]$ b) $AB = \sqrt{13^2 - 5^2} = \sqrt{18 \times 8} = 12\ cm$ c) $\tan A = \frac{5}{12}$ $[\because \tan A = \frac{BC}{AB}]$ d) $\tan A \times \tan C = \frac{5}{12} \times \frac{12}{5} = 1$	1 1 1 1	4
18	a) $r = \sqrt{(3-0)^2 + (4-0)^2} = \sqrt{25} = 5$ b) $(5, 0)$, $(-5, 0)$ c) $\sqrt{(-1-0)^2 + (-5-0)^2} = \sqrt{26}$ Outside the circle.	1 1 1 1	4
19	a) $\angle C = 60^0$ $[\because \angle C + \angle BOC = 180^0]$ b) $\angle A = 60^0$ ===> ABC is an equilateral triangle . Perimeter $= 3 \times 10 = 30\ cm$ $[\because AB = AP + PB]$ c) $r = \frac{5}{\sqrt{3}}\ cm$ $[\because r = \frac{A}{S}, A = \frac{\sqrt{3} \times 10^2}{4} sq.cm, S = \frac{30}{2} = 15\ cm]$ [OR , In right triangle OPA , $r = OP = \frac{5}{\sqrt{3}}\ cm$ ]	1 1 1 1	4

20	a) $AP = \frac{10}{2} = 5\ cm$ b) $PB = 5 \times 0.83 = 4.15\ cm$ $\quad [\because \tan 40^0 = \frac{PB}{PA}]$ c) $BD = 2 \times 4.15 = 8.3\ cm$ Area $= \frac{1}{2} \times 10 \times 8.3 = 41.5\ sq.cm$	1 1 1 1	4
21	a) $\frac{4}{3}\pi r^3 = 4\pi r^2 \implies r = 3$ b) Volume of the sphere $= \frac{4}{3} \times \pi \times 3^3 = \frac{4}{3} \times 27\pi$ Volume of a hemisphere $= \frac{2}{3} \times \pi \times 1^3 = \frac{4}{3} \times \pi$ Number of hemispheres $= \frac{Volume\ of\ the\ sphere}{Volume\ of\ a\ hemisphere} = \frac{\frac{4}{3} \times 27\pi}{\frac{2}{3} \times \pi} = 54$	1 1 1 1	4
	Each questions from 22 to 29 carries 5 scores. (Answer any 6)		
22	a) $x_1 = 4 + 1 = 5$ b) $x_{21} = 4 \times 21 + 1 = 85$ c) Sum $= \frac{21}{2} \times (5 + 85) = \frac{21}{2} \times 90 = 945$ $\quad [\because$ Sum $= \frac{n}{2}(x_1 + x_n)]$ [OR, Sum $= 21 \times$ *Middle term* $= 21 \times x_{11} = 21 \times 45 = 945$] d) $945 + 21 = 966$	1 1 2 1	5
23	a) Volume of the vessel $= \pi \times 20^2 \times 30 = 12000\pi$ ഘന.സെ.മീ. $= \frac{12000\pi}{1000} = 12\pi$ ലി. b) Volume of the water flowing out = Volume of the sphere $= \frac{4}{3} \times \pi \times 15^3 = 4500\pi\ cubic.cm$ $= \frac{4500\pi}{1000} = 4.500\pi\ litres$ Volume of the water remain in the vessel $= 12\pi - 4.500\pi = 7.500\pi\ litres$	1 1 1 1 1	5
24	a)  Height of the building = AB Height of the tower = CD	1	

	b) $AB = 40 \times \tan 50^0 = 40 \times 1.19 = 47.6\ m$ $[\because$ In right triangle ABC , $\tan 50^0 = \frac{AB}{40}$ $]$ c) $DE = 40 \times \tan 35^0 = 40 \times 0.70 = 28\ m$ $[\because$ In right triangle AED , $\tan 35^0 = \frac{DE}{40}$ $]$ Height of the tower $= CD = CE + DE = 47.6 + 28 = 75.6\ m$	2 1 1	5
25	a)  b) Area of the quadrilateral $= 6 \times 4 = 24\ sq.cm$ $[\because$ This quadrilateral is a parallelogram]	4 1	5
26	a) $\angle BAC = 180^0 - (65^0 + 55^0) = 60^0$ b) $\angle ABP = 55^0$ $[\because PA = PB]$ c) $\angle P = 180^0 - (55^0 + 55^0) = 70^0$ $\angle R = 180^0 - (65^0 + 65^0) = 50^0$ $[\because RA = RC]$ $\angle Q = 180^0 - (70^0 + 50^0) = 60^0$ $[\because \angle P + \angle Q + \angle R = 180^0]$	1 1 1 1 1	5
27	 	5	5

28	a) $a = \frac{96}{4} = 24\ cm.$	1	
	b) $l = \sqrt{12^2 + 9^2} = \sqrt{225} = 15\ cm$ $\quad [\because l^2 = \left(\frac{a}{2}\right)^2 + h^2\ ]$	1	
	c) Surface area of a toy $= a^2 + 2al = 24^2 + 2 \times 24 \times 15$	1	5
	$= 1296\ sq.cm$		
	$= \frac{1296}{10000}\ sq.cm$	1	
	Total cost $= 100 \times \frac{1296}{10000} \times 50 = 648\ Rs$	1	
29	a) $1^3 + 2^3 + 3^3 + 4^3 = 10^2 = 100$	1	
	b) $1 + 2 + 3 + 4 + 5 = \frac{5 \times 6}{2} = 15$	1	
	c) $\left(\frac{6 \times 7}{2}\right)^2 = 21^2 = 441$	1	5
	d) $\left(\frac{10 \times 11}{2}\right)^2 = 55^2$	1	
	e) $\left(\frac{n(n+1)}{2}\right)^2$	1	