

MARKING SCHEME
MONTHLY ASSESSMENT OF LEARNING (AUGUST – 2025)
CLASS: XII
SUBJECT: MATHEMATICS (041)

	SECTION - A	1
1	d	1
2	a	1
3	c	1
4	b	1
5	c	1
6	a	1
	SECTION - B	
7	$\frac{dx}{d\theta} = a(1 - \cos \theta)$ $\frac{dy}{d\theta} = -a \sin \theta$ $\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{a(1 - \cos \theta)}{-a \sin \theta} = -\tan \theta$ OR Let $x = \tan \theta$ $y = \cos^{-1} \left(\frac{1 - \tan^2 \theta}{1 + \tan^2 \theta} \right)$ $y = \cos^{-1} (\cos 2\theta)$ $y = 2\theta = 2 \tan^{-1} x$ $\frac{dy}{dx} = \frac{2}{1 + x^2}$	0.5 0.5 1 0.5 0.5 0.5
8	L. H. D. $= \frac{f(3+h)-f(3)}{h} = \frac{-h}{h} = -1$ R. H. D. $= \frac{f(3+h)-f(3)}{h} = \frac{h}{h} = 1$ L. H. D. $\neq$ R. H. D Hence f is not differentiable at $x = 3$	 1.5 0.5
9	$f(x) = 2x^3 - 24x + 107$ $f'(x) = 6x^2 - 24$ $f'(x) = 0$ gives $x = \pm 2$ since $2 \in [1, 3]$, now $f(1) = 85, f(2) = 75, f(3) = 89$ hence maximum value of $f(x)$ is 89 at $x = 3$.	0.5 0.5 0.5 0.5

	$\frac{d^2y}{dx^2} = - \frac{(y-b) - (x-a) \frac{dy}{dx}}{(y-b)^2}$ $= - \frac{[(y-b) + (x-a) \frac{(x-a)}{(y-b)}]}{(y-b)^2} = - \frac{[(y-b)^2 + (x-a)^2]}{(y-b)^3} = \frac{-c^2}{(y-b)^3}$ $\frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}}{\frac{d^2y}{dx^2}} = \frac{\left[1 + \left(\frac{x-a}{y-b}\right)^2\right]^{\frac{3}{2}}}{\frac{-c^2}{(y-b)^3}} = \frac{[(x-a)^2 + (y-b)^2]^{\frac{3}{2}}}{(y-b)^3} \times \frac{(y-b)^3}{-c^2} = \frac{c^3}{(y-b)^3} \times \frac{(y-b)^3}{-c^2} = -$ c Which is a constant independent of a and b.	2
	SECTION - E	
14	(i) $x \cdot y = 24$ $A(x) = (x + 3)(y + 2)$ $A(x) = xy + 2x + 3y + 6$ $A(x) = 2x + \frac{72}{x} + 30$ (ii) $A'(x) = 2 - \frac{72}{x^2}$ $A''(x) = \frac{144}{x^3}$ Solving $A'(x) = 0$ gives $x = 6$ (critical point) $A''(6) = \frac{144}{6^3} > 0$ So area of card is minimum at $x = 6$ and $y = 4$ Length of card with minimum area is 9 cm and breadth is 6 cm	1 1 0.5 0.5 0.5 0.5