

**MAJLIS PENGETUA SEKOLAH MALAYSIA
KUALA LUMPUR**



MODUL *TOP 5* SPM 2025

MATEMATIK TAMBAHAN

Kertas 1

PERATURAN PEMARKAHAN

Peraturan pemarkahan ini mengandungi 8 halaman bercetak

Soalan	Skema Pemarkahan		Markah
1 (a)	$3x - 9y = 0$		1
	$x = 3y$		1
1 (b)	$3^{2+n-1} = 3^{3n}$		1
	$n + 1 = 3n$		1
	$n = -\frac{1}{2}$		1
			5
2(a)	(i)	27 Nota: mesti lihat penggantian 5 sebagai objek di dalam g(x)	1
	(ii)	$f^{-1}(x) = \frac{x+5}{2}$	
	(iii)	$fg(x) = 2(x^2 + 2) - 5$	1
		$fg(x) = 2x^2 - 1$	1
2(b)	(i)	3	1
	(ii)	$(m-2)^2 + 3 = 12$	1
		$m = 5$	1
	(iii)	$3 \leq g(x) \leq 12$	1
			7
3(a)	Htp = $4q$ dan Hdp = $3q^2$ @ $(x-q)(x-3q) = 0$ DAN KEMBANG		1
	$x^2 - 4qx + 3q^2 = 0$		1
3(b)	$5 = 5x^2 - 2x(2kx - m)$		1
	$(2m)^2 - 4(5 - 4k)(-5) = 0$		1
	$k = \frac{m^2 + 25}{20}$		1
			5

4.	$x = 12 - 3y$ @ $y = \frac{12 - x}{3}$ atau setara	1
	$y^2 - (12 - 3y)^2 - 2y(12 - 3y) = 8$ @ $\left(\frac{12 - x}{3}\right)^2 - x^2 - 2x\left(\frac{12 - x}{3}\right) = 8$ atau setara	1
	*Selesaikan persamaan kuadrat	1
	$x = 0.7386, x = -48.75$	1
	$y = 20.25, y = 3.754$	1
		5
5. (a)	$\frac{1}{12} + \frac{1}{12} + \frac{1}{4} + \frac{1}{4} + k = 1$ atau setara	1
	$k = \frac{1}{3}$	1
5(b)	$np = 48$ atau $\sqrt{npq} = 4$ atau $q = \frac{2}{3}$	1
	$p = \frac{2}{3}$	1
	$n = 72$	1
		5
6.(a)	$\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}$	1
	$\frac{1}{\sin \theta \cos \theta} @ \left(\frac{1}{\sin \theta}\right)\left(\frac{1}{\cos \theta}\right)$ *mesti dilihat	1
	$\operatorname{cosec} \theta \sec \theta$	
6.(b)	Penggunaan mana-mana trigonometri identiti	1
	Sudut rujukan = $60^\circ @ \frac{\pi}{3}$	1
	$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$	1
		5

7.	$p + q \left(\frac{1}{x} \right) = \frac{1}{y}$	1
	$p + q = 8$ dan $p + 4q = 2$ ATAU $P + \frac{q}{x} = \frac{1}{y}$ dan $\frac{1}{y} = \frac{-2}{x} + 10$	1
	$p = 10$ dan $q = -2$	1
		3
8(a).	$\frac{dy}{dx} = 6x - 4$	1
	$\delta x = \frac{2.5}{100} \times 3$	1
	14×0.075	1
	1.05	1
8(b)	Guna hukum pengamiran	1
	$q \int_2^8 k(x) + \int_2^8 g(x)$	
	$\frac{8}{9}$	1
		6
9(a)	$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$	1
	$-4\hat{i} - 2\hat{j}$	1
9(b)	$2\vec{a} + h\vec{b} = \lambda(5\vec{a} - \vec{b})$ or $5\lambda = 2$	1
	$h = -\frac{2}{5}$	1
		4
10(a).	-2	1
10(b).	$\frac{1}{2} [2(2) + 5(-2) + k(-2) + (-1)(4) + (-3(5))] - [5(5) + 2(k) + (-2)(-1) + (-2)(-3) + 4(2)] = 39$	1
	$k = 3$	1
		3



11(a).	(i) $9!$	1
	362880	1
(ii)	$\frac{(6-1)!}{2} @ 6C3 \times 3! @ 6P3$ Atau $\frac{(7-1)! \times 3!}{2} @ \frac{(8-1)! \times 2!}{2} @ \frac{(9-1)!}{2}$	1
	$\frac{(6-1)! \times 6P3}{2}$ Atau $\frac{(9-1)!}{2} - \left(3 \times \frac{(8-1)! \times 2!}{2} - \frac{(7-1)! \times 3!}{2} \right)$	1
	7200	1
11(b)	$\frac{p!}{(p-3)!3!} = \frac{9!}{3}(p-2)$	1
	14	1
		6
12(a).	$\frac{L_2}{L_1} = \frac{\frac{1}{2}\pi\left(\frac{1}{2}j\right)^2}{\frac{1}{2}\pi j^2}$ or $\frac{L_3}{L_2} = \frac{\frac{1}{2}\pi\left(\frac{1}{4}j\right)^2}{\frac{1}{2}\pi\left(\frac{1}{2}j\right)^2}$	1
	$r = \frac{1}{4} = \frac{1}{4}$	1
	Jadi L_1, L_2, L_3 membentuk JG	1
12(b).	$\frac{1}{4}$	1
	$S_6 = \frac{\frac{1}{2}\pi j^2 \left(1 - \left(\frac{1}{4} \right)^6 \right)}{1 - \frac{1}{4}}$	1
	$\frac{\frac{1}{2}\pi j^2 \left(\frac{4095}{4096} \right)}{\frac{3}{4}}$	1
		6

13(a)	Menyamakan asas.(Hukum Penukaran asas yang betul)	1
	Penyelesaian persamaan $\log_5(x+1) = 2$ @ $\log_{125}(x+1) = \frac{2}{3}$ @ yang setara	1
	24	1
13(b)	$x(4)(5 - \sqrt{7}) = 52\sqrt{7} - 44$	1
	$\frac{52\sqrt{7} - 44}{20 - 4\sqrt{7}} \times \frac{20 + 4\sqrt{7}}{20 + 4\sqrt{7}}$ @setara	1
	$\frac{1040\sqrt{7} + 1456 - 880 - 176\sqrt{7}}{400 - 112}$	1
	$2 + 3\sqrt{7}$	1
		8
14		
(a)	$\frac{dy}{dx} = 6x^2 - 30x + 24$	1
(b)	Guna $\frac{dy}{dx} = 0$ & selesaikan persamaan kuadratik*	1
	$x = 1$ dan $x = 4$	1
	$(1, 17)$ dan $(4, -10)$	1
(c)	$\frac{d^2y}{dx^2} = 12x - 30$	1
	$\frac{d^2y}{dx^2} = -18 < 0$ or $\frac{d^2y}{dx^2} = 18 > 0$	1
	$(1, 17)$ maksimum dan $(4, -10)$ minimum	1
		8

15.(a)	$k = \frac{3}{2}$	1
(b)	$\frac{3}{-2g(x)+9} = \frac{3}{2x-3}$	1
	$g(x) = -x + 6$	1
(c)	$g(x) = x$	1
	$x = 3$	1
	$g^2(x) = -(-x + 6) + 6$	1
	$g(x) = -x + 6$ $g^2(x) = -(-x + 6) + 6 = x$ $g^3(x) = -x + 6$ $g^4(x) = x$	1
	$g^{2n+6}(x) = x$	1
		8

