SIJIL PELAJARAN MALAYSIA 2021 (SET 1)

MATEMATIK TAMBAHAN

Kertas 1

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 7 halaman bercetak

CADANGAN PERATURAN PEMARKAHAN (SKEMA)
Kertas 1 Set 1
BAHAGIAN A

Soalan	Butiran	Markah
1 (a)(i)		1
1 (a)(ii)	Ya, fungsi.	1
1 (b)(i)	Domain $= \{3, 2, -1, 1\}$ Julat $= \{9, 4, 1\}$	1
1 (b)(ii)	$f(x) = x^2$	1
		4 m
2 (a)	$f(mx + n) = 2x^2 + 8x + 7$ Let $mx + n = y$ $x = \dfrac{y - n}{m}$	1
	$f(y) = 2\left(\dfrac{y - n}{m}\right)^2 + 8\left(\dfrac{y - n}{m}\right) + 7$ $f(y) = \dfrac{2y^2 - 4ny + 2n^2 + 8my - 8mn + 7m^2}{m^2}$	1
2 (b)	$f(x) = \dfrac{2x^2 - 4nx + 2n^2 + 8mx - 8mn + 7m^2}{m^2}$	1
	$2x^2 - 1 = \dfrac{2}{m^2}x^2 + \dfrac{-4n + 8m}{m^2}x + \dfrac{2n^2 - 8mn + 7m^2}{m^2}$ Bandingkan:	
	$2 = \dfrac{2}{m^2}$ $m = 1$	1 1
	$\dfrac{2n^2 - 8mn + 7m^2}{m^2} = -1$ $2n^2 - 8n + 7 = -1$ $n = 2$	1
		6 m

3 (a)	$-m = \alpha + \beta$ atau $\alpha\beta = n$	1
	$\alpha^2\beta + \beta^2\alpha$ $= \alpha\beta(\alpha + \beta)$ $= -nm$	1
3 (b)(i)	$5t^2 - 14t - 3 = 0$ $(5t + 1)(t - 3) = 0$ $t = -\dfrac{1}{5}$ atau $t = 3$ Jawapan : $t = 3\ saat$	1 1
3 (b)(ii)		1 1
		6 m
4	$y = 8 - 4x$ $x^2 - x(8 - 4x) = 8$ $5x^2 - 8x - 8 = 0$ $x = \dfrac{-(-8) \pm \sqrt{(-8)^2 - 4(5)(-8)}}{2(5)}$ $x = 2.297 \qquad x = -0.697$ $y = 8 - 4(2.297) \qquad y = 8 - 4(-0.697)$ $\quad = -1.188 \qquad\qquad = 10.788$	1 1 1 1 1
		5 m
5 (a)	$xy = (a^m)(a^n)$ $xy = a^{(m+n)}$ $\log_a xy = \log_a a^{(m+n)}$ $\log_a xy = m + n$ $\log_a xy = \log_a x + \log_a y$	1 1
5 (b)	$\log_2 64 + \log_2 \sqrt{x}$ $= 6\log_2 2 + \dfrac{\log_x \sqrt{x}}{\log_x 2}$ $= 6 + \dfrac{\frac{1}{2}}{m}$ $= 6 + \dfrac{1}{2m}$	1 1 1
		5 m

6 (a)	$T_1 = a$ $T_2 = a + 1d$ $T_3 = a + 2d$ $T_4 = a + 3d$ Maka, $T_n = a + (n-1)d$	1 1
6 (b)(i)	$12 - x = y + 2 - 12$ $x + y = 22$	1 1
6(b)(ii)	$x + 2d = y + 2$ $x - y = 2 - 2d$	1 1
		6 m
7 (a)	$m_{AB} = -\frac{1}{3}$ $y = -\frac{1}{3}x + 6 \ldots..(1)$ $y = 3x - 4 \ \ldots.. (2)$ (2)–(1): $0 = \frac{10}{3}x - 10$ $x = 3$ Gantikan $x = 3$ dalam (2): $y = 3(3) - 4$ $y = 5$ Koordinat titik B ialah B(3,5)	1 1 1
7 (b)	Luas segitiga ABC $= \frac{1}{2}\begin{vmatrix} 0 & 0 & 3 & 0 \\ 6 & -4 & 5 & 6 \end{vmatrix}$ $= \frac{1}{2}\lvert 0 + 0 + 18 - 0 - (-12) - 0\rvert$ $= 15 \ unit^2$	1 1
		5 m
8 (a)	$\lvert \underset{\sim}{p}\rvert = \sqrt{5^2 + (-12)^2} = 13$	1+1
8 (b)	$\underset{\sim}{p} + \underset{\sim}{q} = \begin{pmatrix} 5 + k + 2 \\ -12 + 3 \end{pmatrix}$ $= \begin{pmatrix} k + 7 \\ -9 \end{pmatrix}$ apabila selari dengan paksi-y, $x=0$, $k + 7 = 0$ $k = -7$	1 1 1
		5 m
9 (a)	$\pi(3)^2 = \frac{1}{2}(9)^2\theta - \frac{1}{2}(3)^2\theta$ $\pi(9) = \frac{1}{2}(81)\theta - \frac{1}{2}(9)\theta$ $9\pi = 36\theta$ $\theta = \frac{1}{4}\pi$ rad. Terbukti.	1 1

9 (b)	Perimeter kawasan berlorek: $\frac{\pi}{4}(3) + 9 + 9 + \frac{\pi}{4}(9)$	1+1
	$= 3\pi + 18$	
	$= 27.42 \; cm$	1
		5 m
10	$y = t - 4t^2 \qquad\qquad x = 5t + 4$ $\frac{dy}{dt} = 1 - 8t \qquad\qquad \frac{dx}{dt} = 5$	1+1
	$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx}$ $\frac{dy}{dx} = (1 - 8t) \times \left(\frac{1}{5}\right)$ $\frac{dy}{dx} = \left[1 - 8\left(\frac{x-4}{8}\right)\right] \times \left(\frac{1}{5}\right)$ $\frac{dy}{dx} = (1 - x + 4)\left(\frac{1}{5}\right)$	1
	$\frac{dy}{dx} = 1 - \frac{1}{5}x$	1
		4 m
11 (a)	$^8P_3 \times {}^1P_1$	1
	$= 336$	1
11 (b)(i)	$^7C_4 \times {}^3C_1$	1
	$= 105$	1
11 (b)(ii)	$({}^4C_3 \times {}^6C_2) + ({}^4C_4 \times {}^6C_1)$	1
	$= 60 + 6$	
	$= 66$	1
		6 m
12 (a)	$2kos^2 2x + 3sin\,2x - 3 = 0$	
	$2(1 - sin^2 2x) + 3sin\,2x - 3 = 0$	1
	$-2sin^2 2x + 3sin\,2x - 1 = 0$	
	$2sin^2 2x - 3sin\,2x + 1 = 0$	
	Let $sin\,2x = y$	
	$2y^2 - 3y + 1 = 0$	
	$(2y - 1)(y - 1) = 0$	
	$y = 1 \qquad\qquad\qquad\quad$ or $\quad y = \frac{1}{2}$	1
	$sin\,2x = 1 \qquad\qquad\qquad sin\,2x = \frac{1}{2}$	
	$2x = 30°, 150°, 390°, 510° \qquad 2x = 90°, 450°$	
	$x = 15°, 75°, 195°, 255° \qquad\quad x = 45°, 225°$	1
	Hence, $x = 15°, 75°, 195°, 255°, 45°, 225°$	1

12 (b)	$\tan 2x = \dfrac{5}{12}$	
	$\cos 2x = -\dfrac{12}{13}$	1
	$\cos 2x = 2\cos^2 x - 1$	
	$-\dfrac{12}{13} = 2\cos^2 x - 1$	1
	$2\cos^2 x = \dfrac{\left(-\dfrac{12}{13}\right)+1}{2}$	
	$\cos^2 x = \dfrac{1}{26}$	1
		7 m

CADANGAN PERATURAN PEMARKAHAN (SKEMA)
Kertas 1 Set 1
BAHAGIAN B

Soalan	Butiran	Markah
13 (a)	$\frac{1}{2}j^2(\frac{31.5}{j}) = 118.125$	1
	$j = 7.5$ cm	1
13 (b)	$7.5\theta = 31.5$	1
	$\theta = 4.2$ rad	1
13 (c)	$\theta_2 = 2.084$ rad atau 119.39°	1
	$\pi(7.5)^2 - 118.125$	1
	$58.6125 - \frac{1}{2}(7.5)^2 \sin 119.39^\circ$	1
	36.028 cm^2	1
		8m
14 (a)	$\frac{dy}{dx} = 2x - 4 = 0$	
	$x = 2$	
	Titik minimum $= (2, 5)$	1
	$y = \int 2x - 4 \, dx$	
	$y = x^2 - 4x + c$	1
	$5 = 2^2 - 4(2) + c$	1
	$y = x^2 - 4x + 9$	1
14 (b)	$8x - x^2 = 7$	
	$x^2 - 8x + 7 = 0$	
	$x = 1 \quad x = 7$	
	$\left[4x^2 - \frac{x^3}{3}\right]_1^7 - (6 \times 7)$	1
		1
	$\left[4(7)^2 - \frac{7^3}{3}\right] - \left[4(1)^2 - \frac{1^3}{3}\right] - 42$	1
	36	1
		8m
15 (a)	Fungsi ini tidak mempunyai fungsi songsang kerana fungsi f bukan fungsi satu dengan satu.	1
15 (b)(i)	$(2, 0)$	1
15 (b)(ii)	$(-9q)^2 - 4(p)(4p) = 0$	1
	$\frac{p^2}{q^2} = \frac{81}{16}$	1
	$p : q = 9 : 4$	1
15 (c)	$9x^2 + 3x - 12 \geq 0$	1
	$3x^2 + x - 4 \geq 0$	
	$(x - 1)(3x + 4) \geq 0$	1
	$x \geq 1, \ x \leq -\frac{4}{3}$	1
		8m