



MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM) CAWANGAN KELANTAN

MODUL KOLEKSI ITEM PERCUBAAN SPM 2024

MATEMATIK TAMBAHAN KERTAS 2

UNTUK KEGUNAAN PEMERIKSA SAHAJA

SKEMA PEMARKAHAN

PERATURAN PEMARKAHAN PEPERIKSAAN PERCUBAAN SPM TAHUN 2024
MATEMATIK TAMBAHAN
TINGKATAN 5
KERTAS 2

NO.			PERATURAN PEMARKAHAN	SUB-MARKAH	MARKAH PENUH
1	(a)		$f^2(x) = 9x + 8$ Katakan $f(x) = ax + b$, $f^2(x) = a^2x + ab + b$ atau setara Banding , $a^2 = 9$, $ab + b = 8$ $f(x) = 3x + 2$ dan $f(x) = -3x - 4$ Fungsi memenuhi syarat, $f(1) = -7$. $f(x) = -3x - 4$	1 1 1 1	8
	(b)	(i)	$\frac{y+1}{3}$ atau $g(x) = \frac{5\left(\frac{y+1}{3}\right)}{3} + 7$ $g(x) = \frac{5x+26}{3}$	1 1	
		(ii)	$\frac{5(p+1)+26}{3} = 2q-3$ $p = \frac{6q-40}{5}$	1 1	
2	(a)		$PA = QA$ and $PB = QB$ $PAQB$ is a Rombus $\angle APB = \angle AQB$ $2\theta + \theta = 2\pi$ (sudut di pusat adalah 2 kali sudut di lilitan) $\theta = \frac{2}{3}\pi$	1 1 1	

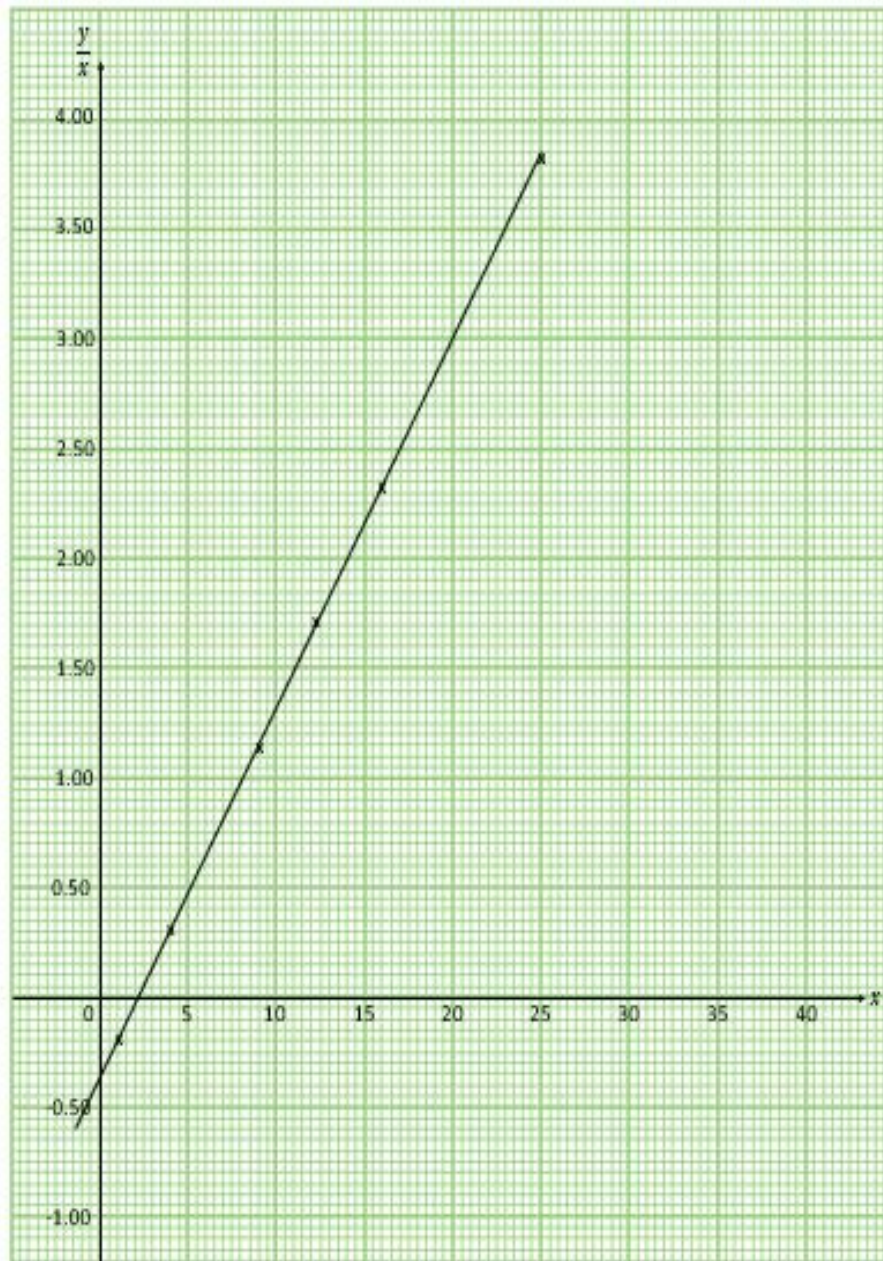
	(b)	Luas tembereng AQB $\frac{1}{2}j^2\left(\frac{2}{3}\pi\right) - \frac{1}{2}j^2\sin\left(\frac{2}{3}\pi @ 120^\circ\right)$ $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)j^2 \text{ cm}^2$ Luas rantau berlorek $\pi j^2 - 2\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)j^2$ $\left(\frac{1}{3}\pi + \frac{\sqrt{3}}{2}\right)j^2 \text{ cm}^2$	1 1	
3	(a)	$10N = 0.454545... \text{ or } 1000N = 45.4545...$ $N = \frac{1}{22} \text{ and } m - n = -21$	1 1	
	(b)	seen $\frac{\sqrt{3}}{2}$ $\frac{1}{2} \times 4j^2 \times \frac{\sqrt{3}}{2} - 3\left(\frac{j^2\pi}{6}\right) = 12\sqrt{3} - 6\pi$ $j^2 = \frac{12\sqrt{3} - 6\pi}{\sqrt{3} - \frac{\pi}{2}} \times \frac{\sqrt{3} + \frac{\pi}{2}}{\sqrt{3} + \frac{\pi}{2}}$ $\frac{36 - 3\pi^2}{3 - \frac{\pi^2}{4}} \text{ or } \frac{12(3 - \frac{\pi^2}{4})}{3 - \frac{\pi^2}{4}}$ $j = 2\sqrt{3}$	1 1 1 1 1	7
4	(a)	$(p)^2 - 4(1)(9) < 0$ $(p - 6)(p + 6) < 0$ atau  $-6 < p < 6$	1 1 1	

	(b)	$f(x) = x^2 + px + \left(\frac{p}{2}\right)^2 - \left(\frac{p}{2}\right)^2 + 9$ atau $g(x) = -[x^2 - 4x + \left(-\frac{4}{2}\right)^2 - \left(-\frac{4}{2}\right)^2 - 2q]$ $f(x) = \left(x + \frac{p}{2}\right)^2 - \frac{p^2 + 36}{4}$ atau $g(x) = (x - 2)^2 + 4 + 2q$ $\frac{-p^2 + 36}{4} = 4 + 2q$ $q = \frac{20 - p^2}{8}$	1		
			1		
			1		7
			1		
5	(a)	$\sqrt{(x - (-3))^2 + (y - 2)^2} \text{ atau } \sqrt{(-6 - (-3))^2 + (-2 - 2)^2}$ $\sqrt{(x - (-3))^2 + (y - 2)^2} = \sqrt{(-6 - (-3))^2 + (-2 - 2)^2}$ $x^2 + y^2 + 6x - 4y - 12 = 0$	1		
			1		
			1		
	(b)	$\frac{2(-3) + 1(x)}{1 + 2} = -6 \text{ atau } \frac{2(2) + 1(y)}{1 + 2} = -2$ $(-12, -10)$	1		
			1		
	(c)	$\frac{1}{2} ((0)(2) + (-3)(-2) + (-6)(0)) - ((0)(-3) + (2)(-6) + (-2)(0)) $ 9	1		
			1		7
6	(a)	$2x + 2r + \pi r = 80$ $2r \left(\frac{80 - 2r - \pi r}{2} \right)$ $A = 80r - 2r^2 - \frac{1}{2} \pi r^2$	1		
			1		
			1		
	(b)	$\frac{dA}{dr} = 80 - 4r - \pi r \text{ dan samakan dengan } 0$ $r = 11.20$ $A = 80(11.20) - 2(11.20)^2 - \frac{1}{2} \pi (11.20)^2$ 448.05	1		
			1		
			1		7
			1		

7	(a)		Graphs of $y = 1 + \sin(2x)$ and $y = 2\cos(2x)$	1	
				1	
				1	
				1	
				1	
	(b)	(i)	3	1	
		(ii)	$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$	1	7
	(a)		$4k + 2m = 11$ atau $\left[\frac{kx^{2+1}}{2+1} + 2mx \right]_0^2 = \frac{34}{3}$ Selesaikan persamaan $4k + 2m = 11$ dan $4k + 6m = 17$ $k = 2$ $m = \frac{3}{2}$	1	
				1	
				1	
	(b)		$m_1 = 8$ dan $(8)(m_2) = -1$ $m_2 = -\frac{1}{8}$ $y - 11 = -\frac{1}{8}(x - 2)$ atau setara $x + 8y = 90$ atau setara	1	
				1	
				1	
	(c)		$\pi \left[\frac{y^{1+1}}{2(1+1)} - \frac{3}{2}y \right]_3^6$ atau $\pi \left[\frac{y^2}{2(2)} - \frac{3}{2}y \right]_3^6$ $\pi \left(\left[\frac{(6)^2}{4} - \frac{3}{2}(6) \right] - \left[\frac{(3)^2}{4} - \frac{3}{2}(3) \right] \right)$ $\frac{9}{2}\pi$	1	
				1	
				1	10

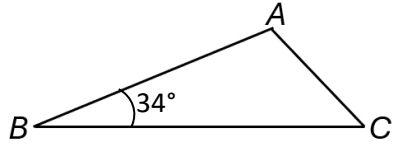
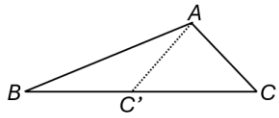


9	(a)	(i)	$\overrightarrow{PM} = \overrightarrow{PN} + \overrightarrow{NM}$ atau $\overrightarrow{OM} = \overrightarrow{ON} + \overrightarrow{NM}$	1	10																												
		(ii)	$\overrightarrow{PM} = 3\underline{x} - 6\underline{y}$ $\overrightarrow{OM} = 10\underline{x} - 4\underline{y}$	1 1																													
	(b)		$\sqrt{34^2 + (-8)^2}$ 34.93	1 1																													
	(c)		$\overrightarrow{PT} = 3h\underline{x} - 6h\underline{y}$ atau $\overrightarrow{TS} = -5k\underline{x} - 4k\underline{y}$ $3h - 5k = -2$ atau $-6h - 4k = -4$ Selesaikan persamaan serentak $k = \frac{4}{7}$ $h = \frac{2}{7}$	1 1 1 1 1																													
10	(a)		<table border="1"><tr><td>x</td><td></td><td></td><td></td><td></td><td>4.00</td><td></td></tr><tr><td>y</td><td></td><td>0.68</td><td></td><td></td><td></td><td></td></tr><tr><td>x^2</td><td></td><td></td><td></td><td>12.25</td><td></td><td></td></tr><tr><td>$\frac{y}{x}$</td><td>-0.17</td><td></td><td>1.17</td><td></td><td>2.33</td><td></td></tr></table> • Betul sekurang-kurangnya 3, 1 markah Betul semua 2 markah	x					4.00		y		0.68					x^2				12.25			$\frac{y}{x}$	-0.17		1.17		2.33		1 1	
x					4.00																												
y		0.68																															
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	(b)		Rujuk graf Graf garis lurus $\frac{y}{x}$ melawan x dilukis - Paksi-paksi betul dan skala seragam - Sekurang-kurang satu* titik diplot betul - Guna data yang diberi dalam soalan 6* titik diplot dengan betul Garis lurus penyuaian terbaik Sekurang-kurangnya -5 * titik diplot -* Jadual dalam 2 tempat perpuluhan	1 1 1																													



	(c)	(i)	$\frac{y}{x} = \left(\frac{h+2}{6}\right)x - \frac{k}{6}$ $\frac{h+2}{6} = 0.1658 *$ $h = -1.0052$	1	
		(ii)	$-\frac{k}{6} = -0.35$ $k = 2.10$	1	
				1	10

11	(a)	(i)	$\frac{3C1(0.5)(0.5)^2 + 3C2(0.5)^2(0.5)}{0.75}$	1 1	10
		(ii)	$\frac{20(0.75)}{15}$ OR $\frac{\sqrt{20(0.75)(0.25)}}{1.936}$	1 1 1	
	(b)	(i)	39	1	
		(ii)	$P\left(\frac{39-45}{8} \leq X \leq \frac{55-45}{8}\right)$ 0.6677	1 1	
		(iii)	$P\left(X \leq \frac{33-45}{8}\right)$ OR 0.06681 12	1 1	
12	(a)		$3x + 6y \leq 160$ $y \geq x + 10$ $x \geq \frac{1}{10}y$	1 1 1	
	(b)			1 1 1	

	(c)	(i)	76 orang	1	10
		(ii)	Titik maksimum = (28, 37) dan garis fungsi objektif dilukis di graf. $k = 16(28) + 8(37)$ 744 *Garis fungsi objektif tidak dilukis di graf 0 markah	1 1 1	
13	(a)			1	
	(b)	(i)	$\frac{1}{2}(9)(BC)\sin 34^\circ = 28$ 11.13	1 1	
		(ii)	$AC^2 = 9^2 + 11.13^2 - 2(9)(11.13)\cos 34^\circ$ 6.228	1 1	10
		(iii)	$\frac{\sin \angle ACB}{9} = \frac{\sin 34^\circ}{6.228}$ 53.91°	1 1	
	(c)		 $\angle BAC' = 19.91^\circ$ $\frac{1}{2}(9)(6.228)\sin 19.91^\circ$ 9.544	1 1 1	
14	(a)		$p = \frac{125 \times 5820}{100}$ 7275	1 1	
	(b)		$\frac{q + 200}{q} \times 100 = 140$ $q = 500$ $r = 700$	1 1 1	

	(c)	$I_K = 129 \text{ and } I_L = 87$ $\bar{I}_{\frac{22}{21}} = \frac{125(1) + 129(1) + 140(1) + 87(1)}{1+1+1+1}$ $\bar{I}_{\frac{22}{21}} = 120.25$ $\frac{110}{100} \times 120.25 = 132.28$	1 1 1 1+1	 10
15	(a)	$25m + 5n = 0 \text{ or } 5m + n = 0$ $a = 2mt + n$ $2m + n = 3$ $m = -1$ $n = 5$	1 1 1 1 1	
	(b)	$-t^2 + 5t > 0 \text{ atau } t^2 - 5t < 0$ $0 < t < 5$	1 1	
	(c)	$S = -\frac{t^3}{3} + \frac{5t^2}{2}$ Use $S_{t=5} - S_{t=4}$ 2.167	1 1 1	10