KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI PULAU PINANG

MODUL GERAK GEMPUR SPM 2024 (SET 1)

3472/2(PP)

MATEMATIK TAMBAHAN

Kertas 2

Peraturan Pemarkahan

UNTUK KEGUNAAN PEMERIKSA SAHAJA

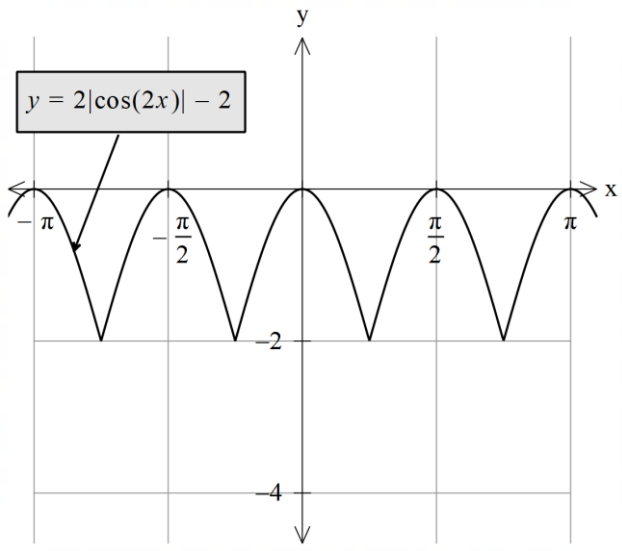
Peraturan Pemarkahan ini mengandungi 19 halaman bercetak.

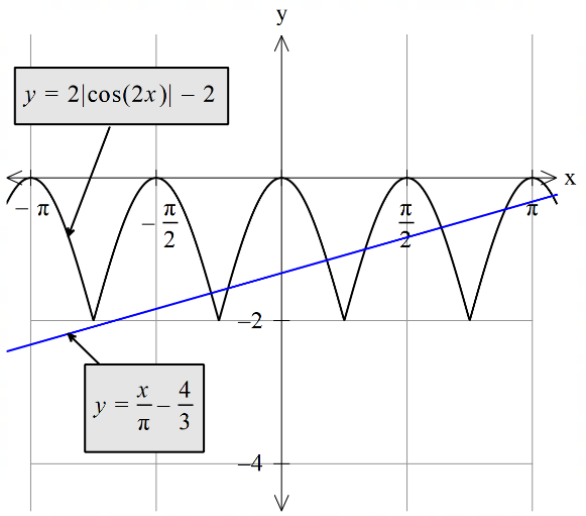
No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
1	$4x + 4y = 100$ **ATAU** $x^2 + y^2 = 425$	P1		
	$x = 25 - y$	P1		
	$(25 - y)^2 + y^2 = 425$	K1		
	$y^2 - 25y + 100 = 0$			
	$(y - 5)(y - 20) = 0$	K1		
	$y = 5$ atau 20	N1		
	$x = 20$ atau 5	N1		
	Panjang keratan pertama $4x = 4(5) = 20$ cm			
	DAN			
	Panjang keratan kedua $4y = 4(20) = 80$ cm	N1		**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
2(*a*)	$log_3 3 + log_3(x-3) = log_3 x$ $log_3 3\,(x-3) = log_3 x$ $3(x-3) = x$ $x = \frac{9}{2}$	K1 N1	2	
(*b*)	$\sqrt{2s+5} = 2 + \sqrt{s-1}$ $\left(\sqrt{2s+5}\right)^2 = \left(2+\sqrt{s-1}\right)^2$ $2s+5 = 4 + 4\sqrt{s-1} + \left(\sqrt{s-1}\right)^2$ $2s+5 = 4 + 4\sqrt{s-1} + s - 1$ $s+2 = 4\sqrt{s-1}$ $(s+2)^2 = \left(4\sqrt{s-1}\right)^2$ $s^2 - 12s + 20 = 0$ $(s-10)(s-2) = 0$ $s = 10\,,\ s = 2$	K1 N1 K1 N1	4	**6**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
3(*a*)	(*i*) $\overrightarrow{BD} = \overrightarrow{BA} + \overrightarrow{AD}$ $= -2\underset{\sim}{x} + 4\underset{\sim}{y}$ (*ii*) $\overrightarrow{AE} = 2\underset{\sim}{x} + 3\underset{\sim}{y}$	K1 N1 N1	3	
(*b*)	$\overrightarrow{AF} = h(2\underset{\sim}{x} + 3\underset{\sim}{y})$ $\overrightarrow{BF} = k\overrightarrow{BD}$ $= k(-2\underset{\sim}{x} + 4\underset{\sim}{y})$ *Selesaikan persamaan* $h = \frac{1}{4} \quad k = \frac{3}{4}$	K1 K1 K1 N1N1	5	**8**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
4(*a*)	$\alpha : \beta = 4:5$ $9tx - x^2 = 80$			
	SOR : $4\alpha+5\alpha = -\frac{-9t}{1}$	K1		
	$\alpha=t$	N1		
	POR = $(4\alpha)(5\alpha) = \frac{80}{1}$			
	$\alpha^2 = 4$			
	$\alpha = \pm 2$	K1		
	$t = 2$ *atau* $t = -2$	N1	4	
(*b*)	$t = 2\ (t>0)$			
	$x^2 - 9(2)x + 80 = 0$ $x^2 - 18x + 80 = 0$ $(x-8)(x-10) = 0$ $x = 8, x = 10$	K1		
	$\alpha = 8$, $\alpha = 10$ *SOR* baharu: $\alpha^2 + \beta^2 = 8^2 + 10^2$ $= 164$	K1		
	POR baharu : $\alpha^2(\beta^2) = 8^2\ (10^2)$ $= 6400$	K1		
	Persamaan kuadratik ialah $x^2 - 164x + 6400 = 0$	N1	4	**8**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
5(a)	$LHS = (2 - se\,k^2\,x)(1 - sin^2\,x)$ $= \left(2 - \frac{1}{kos^2 x}\right)(1 - sin^2\,x)$ $= \left(\frac{2kos^2 x - 1}{kos^2 x}\right)(kos^2 x)$ $= 2kos^2 x - 1$ $= kos2x(terbukti)$	K1 N1	2	
(b)	(i)  Shape Modulus and Shifted down 2 units	P1 P1	2	

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
(*b*)	(*ii*) $6\pi\lvert(2-sek^2\,x)(1-sin^2\,x)\rvert = 3x+2\pi$ $6\pi\lvert kos\,2\,x\rvert = 3x+2\pi$ $2\lvert kos\,2\,x\rvert - 2 = \frac{x}{\pi}-\frac{4}{3}$ $y = \frac{x}{\pi}-\frac{4}{3}$  Garis lurus dengan kecerunan +ve dilukis Bilangan penyelesaian = 6	P1 K1 N1	3	**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
6(a)	$a = 80, d = -4$ $0 = 80 + (n-1)(-4)$ $n = 20$	K1 K1 N1	3	
(b)	(i) $v = \pi(80)^2(30)$ $v = 192000\pi$	K1 N1		
	(ii) $s_{20} = \frac{20}{2}(2(30) + (20-1)(-1))$ $= 410$	K1 N1	4	**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
7(*a*)	$\int_{3}^{1} \mathbf{2} f(y)dy = (\mathbf{-2}) \times (\mathbf{-5})$	P1		
	$= \mathbf{10}$	N1	2	
(*b*)	$y = \int px^2 - \mathbf{2}xdx$			
	$y = \frac{px^3}{\mathbf{3}} - \frac{\mathbf{2}x^2}{\mathbf{2}} + c$	K1		
	$\mathbf{6} = \frac{p(\mathbf{1})^3}{\mathbf{3}} - (\mathbf{1})^2 + c$ ATAU $-\mathbf{15} = \frac{p(\mathbf{-2})^3}{\mathbf{3}} - (\mathbf{-2})^2 + c$	K1		
	selesaikan persamaan serentak	K1		
	$p = \mathbf{6}$ DAN $c = \mathbf{5}$	K1		
	$y = \mathbf{2}x^3 - x^2 + \mathbf{5}$	N1	5	**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
8(*a*)	$m = 1 \; dan \; n = 1$	P1P1	2	
(*b*)	$\left(\frac{2k+7k}{2}, \frac{4k+k}{2}\right)$ atau $\left(\frac{(2k)(1)+(7k)(1)}{1+1}, \frac{(4k)(1)+(k)(1)}{1+1}\right)$	K1K1		
	$h + k = \frac{4k+k}{2}$	K1		
	$h = \frac{3}{2}k$	N1	4	
(*c*)	$h = 3 \; atau \; k = 2$	P1		
	$\frac{1}{2}\left\|\begin{matrix}[(4)(2)+(14)(L-2)+(8)(2)+(0)(8)] \\ -[(4)(2)+(0)(L-2)+(8)(2)+(14)(8)]\end{matrix}\right\| = 105$	K1		
	$14L - 140 = \pm 210$			
	$L = 25, L = -5$	K1		
	$S(8, -7)$	N1	4	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
9(*a*)	<table><tr><td>$\sqrt{y}$</td><td>0.39</td><td>0.71</td><td>1.00</td><td>1.30</td><td>1.58</td><td>1.90</td></tr></table>	N1	1	
(*b*)	Paksi betul,skala seragam, satu titik plot betul dan graf garis lurus	K1		
	Semua titik ditanda betul	K1		
	Garis lurus penyuaian terbaik	N1	3	
(*c*)	(*i*) $\sqrt{y} = ax + \frac{1}{b}$	P1		
	$x = 2.45$	N1		
	(*ii*) $\frac{\mathbf{1}}{b} = \mathbf{0.08}$	K1		
	$b = \mathbf{12.5}$	N1		
	$a = \frac{\mathbf{1-0.39}}{\mathbf{3-1}}$	K1		
	$a = \mathbf{0.305}$	N1	6	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
10(*a*)	$6x - 2x^2 = 0$ $2x\,(3 - x) = 0$ $\left(0, \frac{1}{2}\right)$, $\left(3, \frac{19}{2}\right)$	K1 K1 N1 N1	4	
(*b*)	$\frac{d^2y}{dx^2} = 6 - 4x$ dan 6 **atau** $\frac{d^2y}{dx^2} = 6 - 4x$ dan -6 **ATAU** x | -1 | 0 | 1 $\frac{dy}{dx}$ | - | 0 | + tangen | ↘ | — | ↗ atau x | 2 | 3 | 4 $\frac{dy}{dx}$ | + | 0 | - tangen | ↗ | — | ↘	K1		
	$\left(0, \frac{1}{2}\right)$, *titik minimum dan* $\left(3, \frac{19}{2}\right)$ *titik maksimum*	N1 N1	3	
(*c*)	$\frac{dy}{dx} = 6(2) - 2(2)^2$	P1		
	$\delta y = \left[6(2) - 2(2)^2\right] \times 0.01$	K1		
	$\frac{43}{6} + 0.04 = \frac{1081}{150}$	N1	3	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
11(a)	(i) $\frac{400-420}{50}$	K1		
	0.3446	N1		
	(ii) $z=(-)0.524$	P1		
	$-0.524=\frac{m-420}{50}$	K1		
	393.8 / / 394	N1	5	
(b)	(i) ${}^{40}C_{15}(0.25)^{15}(0.75)^{25}$	K1		
	0.0282	N1		
	(ii) 24 or $n=25$ or $r=9$	P1		
	${}^{25}C_{9}(0.25)^{9}(0.75)^{16}$	K1		
	0.0781	N1	5	**10**

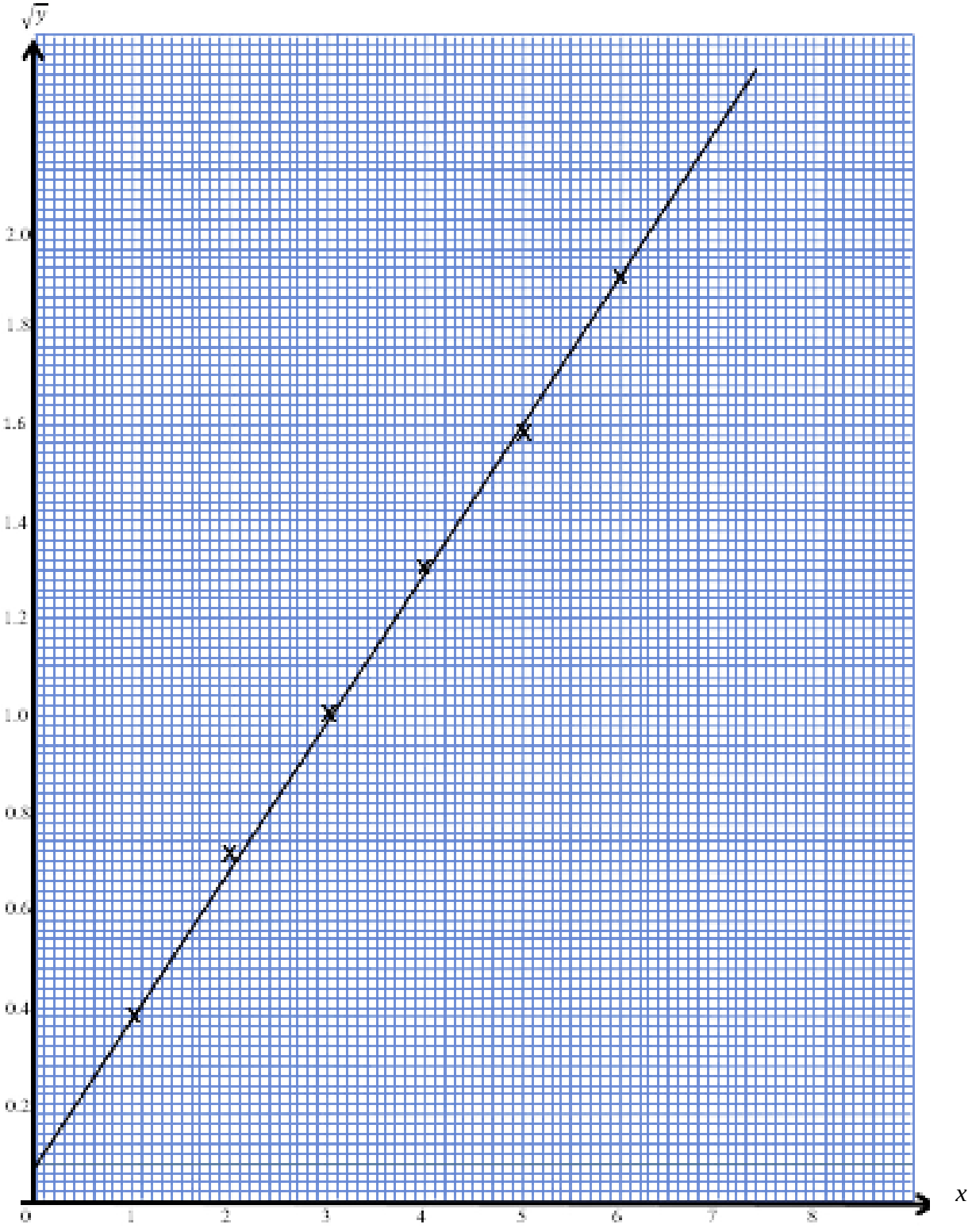
No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
12(*a*)	$p = \frac{16.20}{15.00} \times 100$ $p = 108$	K1 N1		
	$\frac{34}{q} \times 100 = 136$ $q = 25$	 N1	3	
(*b*)	(*i*) $\frac{\mathbf{6(110)+4(108)+3(136)+}r\mathbf{(120)}}{\mathbf{6+4+3+}r} = \mathbf{117}$ $r = \mathbf{7}$	K1 N1		
	(*ii*) $\bar{I}_{\frac{2026}{2022}} = \frac{117}{100} \times \frac{140}{100} \times 100$ $\bar{I}_{\frac{2026}{2022}} = 163.8$	K1 N1		
	(*iii*) $\frac{P_{2026}}{35} \times 100 = 163.8$ $P_{2026} = RM57.33$	 N1		
	(*iv*) $\frac{\mathbf{6}(I)+\mathbf{4(108)+3(136)+7(120)}}{\mathbf{6+4+3+7}} = \mathbf{163.8}$ $I = \mathbf{266}$ **166**%	K1 N1	7	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
13(*a*)	$\frac{ED}{\sin \mathbf{45°}} = \frac{\mathbf{12}}{\sin \mathbf{37°}}$ $ED = \mathbf{14.10}$	K1 N1	2	
(*b*)	$\frac{AD}{\sin \mathbf{98°}} = \frac{\mathbf{12}}{\sin \mathbf{37°}}$ $AD = \mathbf{19.75}$ **ATAU** $AD^2 = 12^2 + 14.10^2 - 2(12)(14.10) \cos 98°$ $AD = 19.75$	K1 N1		
	$\left(\sqrt{\mathbf{288}}\right)^2 = \mathbf{14.10^2} + \mathbf{23.11^2} - \mathbf{2}\left(\mathbf{14.10}\right)\left(\mathbf{23.11}\right) kos\angle EDB$ $\angle EDB = \mathbf{46.95°}$ Luas $= \frac{\mathbf{1}}{\mathbf{2}}\left(\mathbf{14.10}\right)\left(\mathbf{23.11}\right)\sin \mathbf{46.95°}$ $= \mathbf{119.06}$ **ATAU** $\sqrt{27.09(27.09-16.97)(27.09-14.10)(27.09-23.11)}$	K1 N1 K1 N1	6	
(*c*)	$\frac{\mathbf{1}}{\mathbf{2}}\left(\mathbf{23.11}\right)\left(h\right) = \mathbf{119.06}$ $h = \mathbf{10.30}$	K1 N1	2	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
14(*a*)	(*i*) 6	N1		
	(*ii*) $0 < t < 6$	N1	2	
(*b*)	(*i*) $Ganti\ t = 0, 6, 8\ dan\ v = 16$	K1		
	$v = t^2 - 6t$	N1		
	(*ii*) $a = 2t - 6$	K1		
	$a = -2ms^{-2}$	N1		
	(*iii*) $s = \frac{t^3}{3} - \frac{6t^2}{2}$	K1		
	Ganti $t = 3@6@8\ ke\ dalam\ s$	K1		
	$\left\|\int_3^6 vdt\right\| + \int_6^8 vdt$	K1		
	$\frac{98}{3}@32.67$	N1	8	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
15(*a*)	I: $y \leq 3x$	**N1**		
	II: $5x+4y \geq 160$	**N1**	2	
(*b*)	Jumlah jisim udang dan ikan pari yang dibeli tidak lebih daripada 100 kg.	**N1**	1	
(*c*)	Satu garis lurus dan kedua-dua paksi dilukis dengan skala yang betul.	**K1**		
	Semua garis dilukis dengan betul.	**N1**		
	Rantau R dilorek dengan tepat	**N1**	3	**7**
(*d*)	(*i*) Bila $y = 20$ kg, minimum $x = 16$ kg			
	16 kg	**N1**		
	(*ii*) Fungsi objektif kos, $K = 25x + 20y$			
	Titik optimum (100, 0)	**P1**		
	Amaun maksimum wang yang dibayar			
	RM [25(100) + 20(0)]	**K1**		
	RM2500	**N1**	4	**10**

GRAF SOALAN 9



GRAF SOALAN 15