JABATAN PENDIDIKAN NEGERI PULAU PINANG

MODUL GERAK GEMPUR SPM 2024 (SET 2)

3472/2(PP)

MATEMATIK TAMBAHAN

Kertas 2

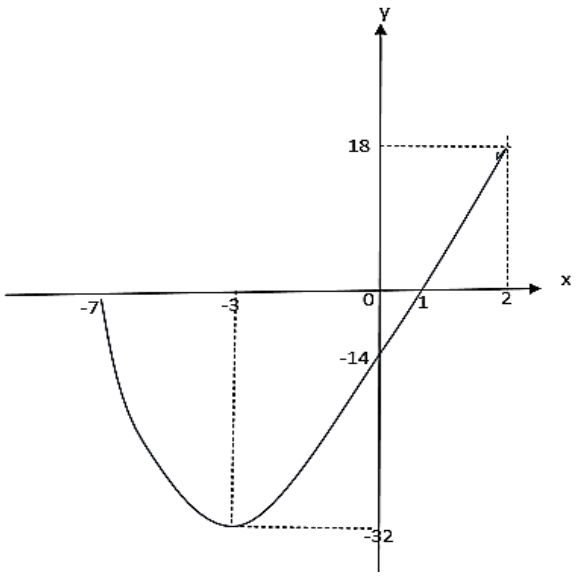
Peraturan Pemarkahan

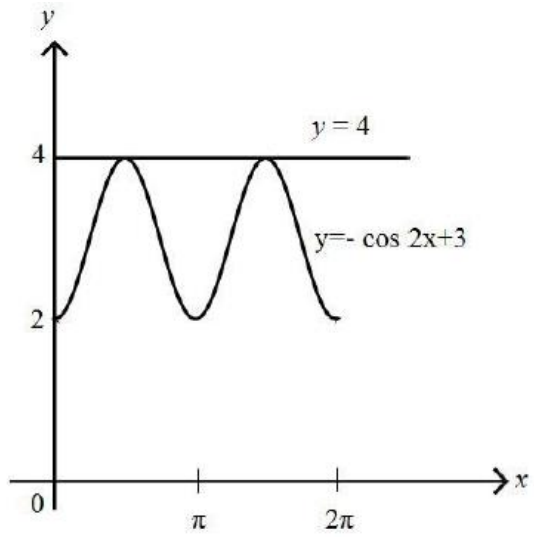
UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan Pemarkahan ini mengandungi 16 halaman bercetak.

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
1	$MN + NT = 32$ $y + (9 + x) = 32$ $x + y = 23$ ……1 $\frac{MN}{NT} = \frac{PQ}{QT}$ $\frac{y}{9+x} = \frac{5}{x}$ $xy = 5(9 + x)$ $xy = 45 + 5x$ $xy - 5x = 45$ $xy - 5x = 45$ ……..2 Daripada …1 $y = 23 - x$ …….3 Gantikan 3 dalam 2 $x(23 - x) - 5x = 45$ $x^2 - 18x + 45 = 0$ $(x - 15)(x - 3) = 0$ $x = 15, x = 3$ $y = 8, y = 20$	K1 K1 P1 K1 K1 N1 N1	7	7

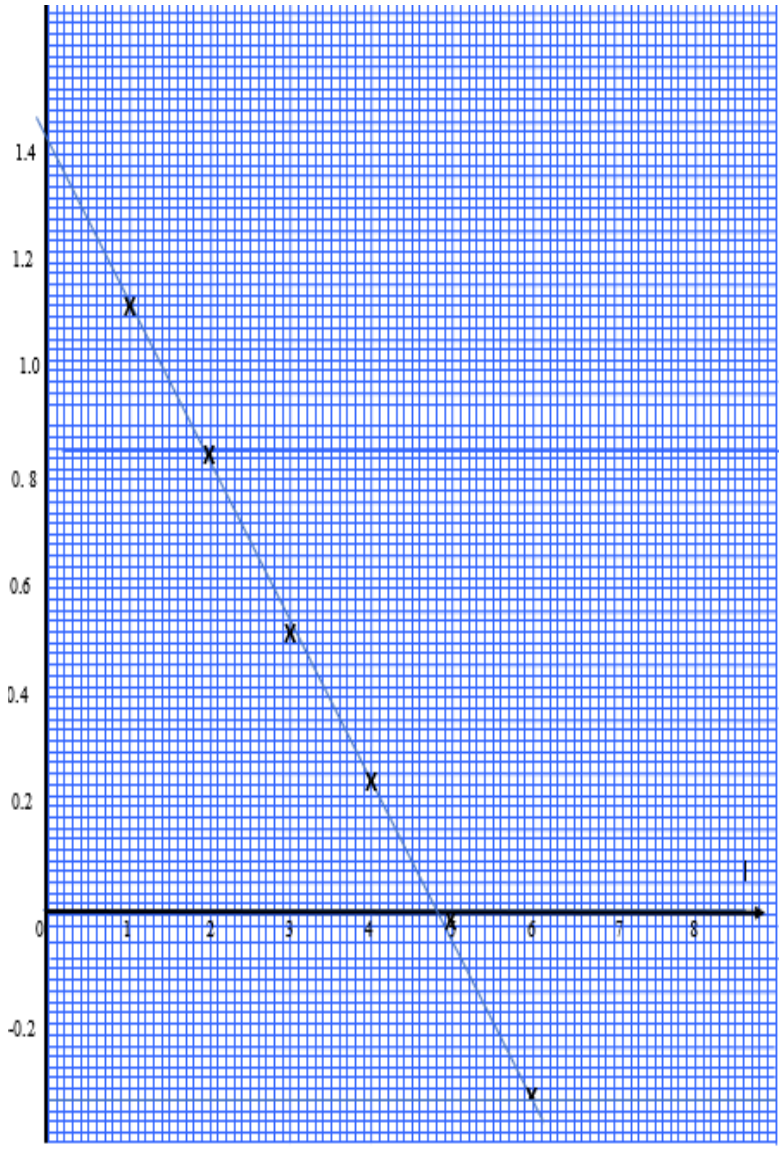
No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
2(a)	$\frac{7}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}}$ DAN $\frac{21+7\sqrt{2}}{9-2}$	K1		
	$\left(\sqrt{a+b\sqrt{2}}\right)^2 = \left(3+\sqrt{2}\right)^2$	K1		
	$a+b\sqrt{2} = 11+6\sqrt{2}$	N1	4	
	$a = 11$	N1		
	$b = 6$			
(b)				
	$e^{2\ln 11} + e^{2\ln 6}$	K1	2	
	$e^{\ln(11)^2} + e^{\ln(6)^2}$ @ $(11)^2 + (6)^2$	N1		**6**
	157			
3(a)	$\overrightarrow{OD} = \alpha\overrightarrow{OC}$	K1	2	
	$= 6\alpha\underset{\sim}{a} + 9\alpha\underset{\sim}{b}$	N1		
(b)	$\overrightarrow{OD} = \overrightarrow{OA} + \overrightarrow{AD}$	K1	2	
	$= 2\underset{\sim}{a} + \beta(-2\underset{\sim}{a} + 4\underset{\sim}{b})$			
	$= (2-2\beta)\underset{\sim}{a} + 4\beta\underset{\sim}{b}$	N1		
(c)	$6\alpha\underset{\sim}{a} + 9\alpha\underset{\sim}{b} = (2-2\beta)\underset{\sim}{a} + 4\beta\underset{\sim}{b}$	K1	4	
	$6\alpha = 2-2\beta$	K1		
	$9\alpha = 4\beta$			
	$6\alpha = 2-2\left(\frac{9\alpha}{4}\right)$			
	$\alpha = \frac{4}{21}$	N1		
	$\beta = \frac{3}{7}$	N1		**8**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
4(a)	$y = p(x^2 + 6x - 7)$ $-14 = p(0^2 + 6(0) - 7)$ $p = 2$	N1	1	
(b)	$y = 2(x^2 + 6x - 7)$			
	$= 2[(x^2 + 6x + (\frac{6}{2})^2 - (\frac{6}{2})^2 - 7]$	K1		
	$= 2[(x + 3)^2 - 16]$		3	
	$= 2(x + 3)^2 - 32$	N1		
	Titk minimum (-3 , -32)	N1		
(c)	Bentuk	P1		
	Pintasan paksi -x = -7 dan 1 dan pintasan -y = 18	P1		
	Titik (2,18) dalamn domain.	P1	4	
	Min point (-3,-32)	N1		
				**8**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
5(a)	Guna $\text{kosek}^2 x = 1 + \text{kot}^2 x$ Guna $1 - 2\sin^2 x = \text{kos}\, 2x$	K1 N1	2	
(b)(i)				
	Bentuk graf kosinus	P1	5	
	Bilangan kala = 2	P1		
	Amplitud $(y_{\min} = -2,\ y_{\max} = 4)$, anjakan +3	P1		
	Pantulan	P1		
	$m > 4,\ m < 2$	N1		**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
6	Sebutan pertama = 1800 Beza sepunya = -150 $450 = 1800 + (n-1)(-150)$ $n = 10$ $S_{10} = \frac{10}{2}[2(1800) + (10-1)(-150)]$ = 11250 11250 x RM 0.80 =RM 9000	P1 K1 K1 K1 K1 K1 N1	7	**7**
7 (a)	$(y-3)^2 = 1$ $y - 3 = 1$ @ $y - 1 = -3$ $y = 4, 2$ $P(1, 2)$ $Q(1, 4)$	N1N1	2	
(b)	$\int_2^4 (y-3)^2\, dy$ $\left[\frac{(y-3)^3}{3(1)}\right]_2^4$ $\left[\frac{(4-3)^3}{3(1)} - \frac{(2-3)^3}{3(1)}\right] = \frac{2}{3}$ Luas = $2 - \frac{2}{3} = \frac{4}{3}$	K1 N1	2	
(c)	Isipadu janaan = $\frac{\pi}{2}\int_2^4 (y-3)^4\, dy$ $\frac{\pi}{2}\left[\frac{(y-3)^5}{5(1)}\right]_2^4$ $\frac{\pi}{2}\left[\frac{(4-3)^5}{5} - \frac{(2-3)^5}{5}\right] = \frac{\pi}{5}$ *or* $\pi(1)^2(2)$ $2\pi - \frac{\pi}{5} = \frac{9}{5}\pi$	K1 K1 N1	3	**7**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
8(a)	kecerunan $DG = 4$ $y - 7 = 4(x - 1)$ atau setara $4x - y + 3 = 0$	P1 K1 N1	3	
(b)(i)	$\frac{6-n}{5-m} = 4$ $4m - n = 14$ atau setara	K1 N1	2	
(ii)	$\frac{1}{2}\begin{vmatrix} 1 & 5 & m & 1 \\ 7 & 6 & n & 7 \end{vmatrix}$ $\frac{1}{2}\|(1(6) + 5n + 7m) - (7(5) + 6m + n)\|$ $Luas = \frac{1}{2}(-29 + m + 4n)$ $atau$ $Luas = \frac{1}{2}(29 - m - 4n)$ Menyelesaikan persamaan serentak $4m - n = 14$ dan $\frac{29-m-4n}{2} = 34$ $m = 1$, $n = -10$	K1 N1 K1 N1 N1	5	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
9 (a)	<table><tr><td>r</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>rt</td><td>1.14</td><td>0.84</td><td>0.52</td><td>0.24</td><td>-0.05</td><td>-0.36</td></tr></table> 	N1 N1 N1 N1	1 3	

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
(b)(i)	$\mathbf{t^2 = \frac{9}{25r^2}}$ $\mathbf{rt^2 = \frac{9}{25}}$ $\mathbf{rt = \frac{3}{5}}$ $\mathbf{= 0.6}$	N1	1	
(ii)	*Daripada graf, apabila rt = 0.6, r = 2.8* $\frac{p^2}{r} - t = \sqrt[3]{q}$ $t = -\sqrt[3]{q} + \frac{p^2}{r}$ $rt = -\sqrt[3]{q}r + p^2$ p^2 = Pintasan rt $= 1.44$ $p = 1.2$ $-\sqrt[3]{q}$ = kecerunan /gradient $q = 0.027$	P1 K1 N1 K1 N1	5	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
10(a)(i)	$\frac{dy}{dx} = 12x^2 - 24x + 9$	N1	2	
	$\frac{d^2y}{dx^2} = 24x - 24$	N1		
(ii)	$\frac{dy}{dx} = 0$			
	$(6x-3)(2x-3) = 0$			
	$x = \frac{1}{2}, x = \frac{3}{2}$	K1	4	
	$y = -2, y = -4$	K1		
	$\left(\frac{1}{2}, -2\right), \left(\frac{3}{2}, -4\right)$	K1		
		N1		
(b)	$r = 4(12) = 48$	K1		
	$\frac{dA}{dt} = 2\pi(48) \times 4$	K1K1	4	**10**
	$\frac{dA}{dt} = 384\pi$	N1		

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
11(a)(i)	$p = 0.46, q = 0.54$ $P(X = 3) = 7C_3\ (0.46)^3\ (0.54)^4$ $= 0.2897$ $p = 0.54, q = 0.46$	K1 N1	2	
(ii)	$P(X \leq 2) = 7C_0\ (0.54)^0(0.46)^7 + 7C_1\ (0.54)^1(0.46)^6 + 7C_2\ (0.54)^2(0.46)^5$ $= 0.1663$	K1 N1	2	
(b)(i)	$P(X < 60) = 0.8092$ $P\left(Z < \frac{60 - m}{8}\right) = 0.8092$ $P\left(Z > \frac{60 - m}{8}\right) = 1 - 0.8092$ $= 0.1908$ $\frac{60 - m}{8} = 0.875$ $m = 53$	K1 N1	2	
(b)(ii)	$P(43 < X < 50)$ $= P\left(\frac{43 - 53}{8} < Z < \frac{50 - 53}{8}\right)$ $= P(-1.25 < Z < -0.375)$ $= P(Z > 0.375) - P(Z > 1.25)$ $= 0.3538 - 0.1056$ $= 0.2482$ $np = 920(0.2482)$ $= 228.344$ Bilangan murid $= 228$ orang	K1 K1 K1 N1	4	**10**

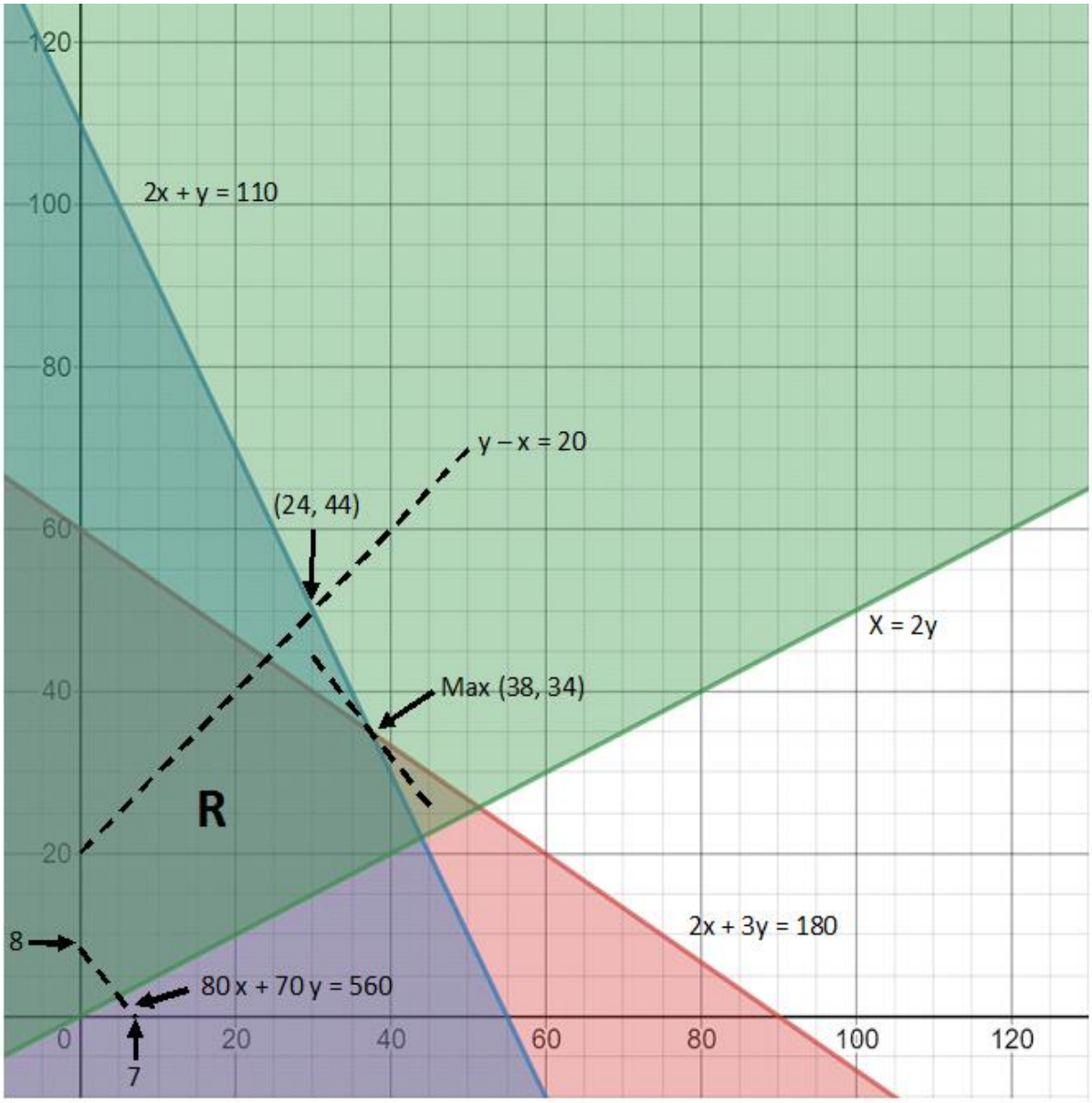
No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
12(a)(i)	$\frac{\mathbf{100}\times\mathbf{130}}{x}=\mathbf{100}$ $x=\mathbf{130}$ $\frac{175\times80}{\mathrm{y}}=\mathbf{100}$ $y=\mathbf{140}$	K1 N1 N1	3	
(ii)	$\frac{\mathbf{7.70}}{P_{16}}\times\mathbf{100}=\mathbf{140}$ $P_{16}=\mathbf{5.50}$	K1 N1	2	
(b)	$\frac{\mathbf{130(2)}+\mathbf{150(5)}+\mathbf{120(3)}+\mathbf{125}p+\mathbf{140(4)}}{\mathbf{2}+\mathbf{5}+\mathbf{3}+p+\mathbf{4}}=\mathbf{134}$ $p=\mathbf{6}$	K1,K1 N1	3	
(c)	harga kos/ $\cos t$ *price* = RM75 × 1.34 =RM100.50 harga jual/ *selling price* = RM100.50 ×170% = RM170.85	K1 N1	2	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
13(a)	$\frac{125}{\sin \angle BAC} = \frac{96}{0.7}$	K1		
	$\sin \angle BAC = 65.71°$			
	$\angle ABC = 69.86°$	N1	4	
	$\frac{AC}{\sin 69.86°} = \frac{96}{\sin 44.43°}$ *atau setara*	P1		
	$AC = 128.7$	N1		
(b)(i)	$128.75^2 = 55^2 + 99^2 - 2(55)(99)\cos \angle ADC$	K1		
	$\angle ADC = 110.15°$	N1	2	
(b)(ii)	$\frac{1}{2}(5)(99)\sin 110.15°$	K1		
	2555.87	N1	2	
(c)	$\frac{1}{2} \times d \times 128.75 = 2555.87$	K1		
	39.70	N1	2	**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
14(a)	$v = 0, 10 + 3t - t^2 = 0$			
	$t = -2, t = 5$	K1		
	$a = 3 - 2t$		3	
	$a = 3 - 2(5)$	K1		
	$a = -7ms^{-2}$	N1		
(b)	$3 - 2t = 0, t = \frac{3}{2}$	K1		
	$v = 10 + 3\left(\frac{3}{2}\right) - \left(\frac{3}{2}\right)^2$	K1	3	
	$v = 12\frac{1}{4}ms^{-1}$	N1		
(c)	$s = 10t + \frac{3t^2}{2} - \frac{t^3}{3}, t = 0, s = 0, c = 0$	K1		
	$t = 5, s = 10(5) + \frac{3(5)^2}{2} - \frac{(5)^3}{3} = 45\frac{5}{6}$	K1		
	Atau			
	$t = 9, s = 10(9) + \frac{3(9)^2}{2} - \frac{(9)^3}{3} = 31\frac{1}{2}$		4	
	$= 2\left(45\frac{5}{6}\right) + 31\frac{1}{2} = 123\frac{1}{6}m$	N1		**10**

No	Peraturan Pemarkahan	Sub Markah	Markah	Jumlah Markah
15 (a)	$2x + 3y \leq 180$	N1		
	$2x + y \leq 110$	N1	3	
	$x \leq 2y$	N1		
(b)	*Lihat graf*	K1N1N1	3	
(c)(i)	$80x + 70y = 560$			
	$(38,34)$			
	$80(38) + 70(34)$	K1	2	
	RM54.20	N1		
(ii)	$y - x \geq 20$	K1	2	**10**
	Maksimum kek = 24 Maksimum roti = 44	N1		

15 (b)


120
100
80
60
40
20
0
20
40
60
80
100
120
2x + y = 110
y – x = 20
(24, 44)
X = 2y
Max (38, 34)
R
2x + 3y = 180
8
80 x + 70 y = 560
7