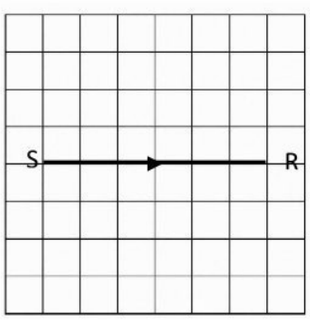
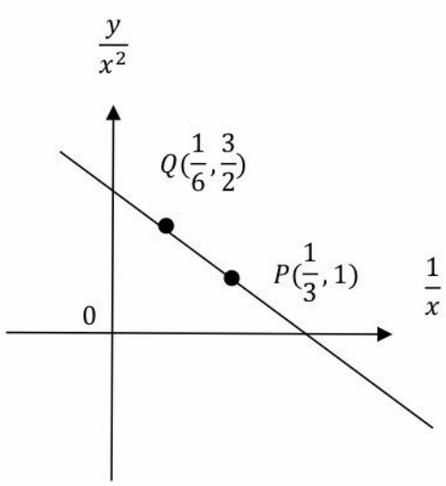
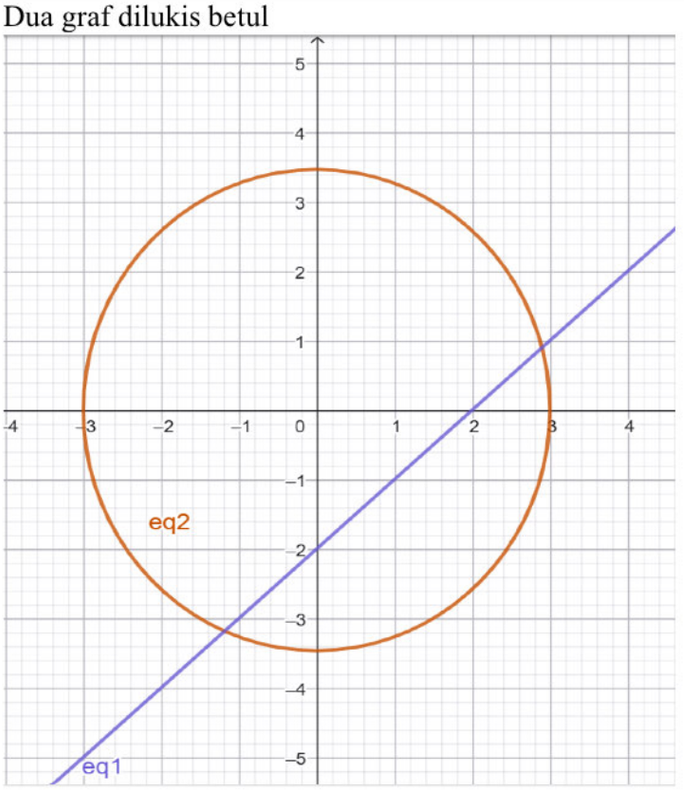
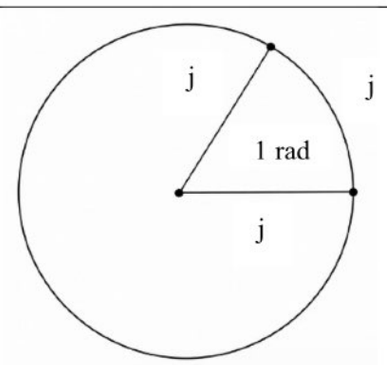
SKEMA PEMARKAHAN PEPERIKSAAN PERCUBAAN SPM (SET 1)

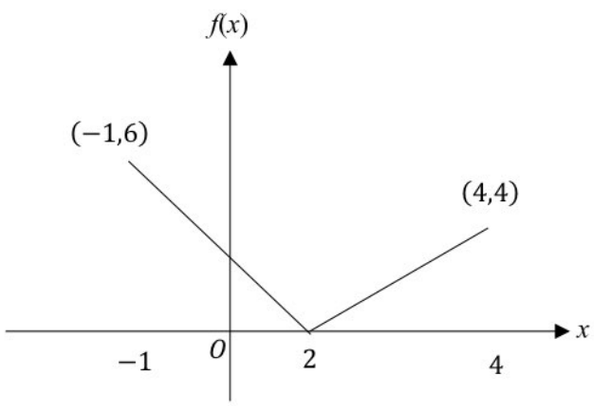
MATEMATIK TAMBAHAN KERTAS 1 202(

No.		Skema Pemarkahan	Sub Markah	Jumlah Markah
1	(a)	$e = \frac{4(4r)+3(3e)}{7}$ $atau$ $f = \frac{4(r)+3(4f)}{7}$ $r = -\frac{e}{8}$ atau $r = -\frac{5f}{4}$ $e = 10f$	K1 K1 N1	**3**
	(b)	$PS = 2PT$ $\sqrt{(x-1)^2+(y-2)^2} = 2\sqrt{(x-4)^2+(y+1)^2}$ $x^2+y^2-10x+4y+21=0$	P1 K1 N1	**3**
2	(a)	Kuantiti vektor  Lukis anak panah –N1 label-N1	N1 N1 N1	**3**
	(b)	$\left\|\overrightarrow{PQ}\right\| = \sqrt{2^2+5^2}$ $\sqrt{29}$ @ 5.3851 Arah timur laut	K1 N1 N1	**3**
3	(a)(i)	$T_1 = p(3)^{1-1} = p$ dan $T_2 = p(3)^{2-1} = 3p$ $p+3p=24$ $p=6$	K1 N1	**3**
	(a)(ii)	$T_1 = 6$	N1	

	(b)	$x = \frac{0.54}{1-0.01}$ $x = \frac{6}{11}$	K1 N1	**2**
4	(a) (i)	$\frac{9-3}{6-3}$ 2	K1 N1	**3**
	(a)(ii)	$0 = 2X - 3$ $x = \frac{3}{2}$	 N1	
	(b)		N1	**1**
5	(a)	$(a)\ (2x-1)\ (x+3) = 0$ $p = \frac{1}{2}$ $q = -3$	K1 N1 N1	**3**
	(b)	$\left(\frac{1}{2} + 2\right)$ atau $(3(-3) - 1)$ $HTP = -\frac{15}{2}$ atau $HDP = -25$ Pastikan jalan kerja ini ditulis untuk dapat N1 $x^2 - \left(-\frac{15}{2}\right)x + (-25) = 0$ $2x^2 + 15x - 50 = 0$ atau $x^2 + \frac{15}{2}x - 25 = 0$	K1 K1 N1	**3**
6	(a)	2 ± 3.46	N1 N1	**2**

	(b)	Dua graf dilukis betul  Graf menunjukkan 2 titik persilangan	K1, K1 N1	**3**
	(c)	$(-1.18, -3.18)$ $(2.9, 0.9)$	N1	**1**
7	(a)	 	N1	**1**
	(b)	$(x+2)\left(120 \times \frac{\pi}{180}\right)$ $\left(\frac{2x+4}{3}\right)\pi$	K1 N1	**2**
8	(a)	$\lim_{x \to 1} \frac{(x-3)(x+3)}{x-1}$ 6	K1 N1	**2**

	(b)	$y + \delta y = 2(x + \delta x)^2$ $\frac{\delta y}{\delta x} = 4x + 2\delta x$ $\lim_{\delta x \to 0} 4x + 2(0)$ $4x$	K1 K1 N1	**3**
9	(a)	$\frac{5}{2} - \int_h^k f(y)dy + \frac{9}{2} = 8$ -1	K1 N1	**2**
	(b)	$-1 + 3\left(\frac{9}{2}\right)$ $\frac{25}{2}$	K1 N1	**2**
10	(a)	$3^x\,(3^1 - 1) = 18$ $3^x = 3^2$ $x = 2$	K1 K1 N1	**3**
	(b)	$t = \frac{8\sqrt{2} + 10}{\frac{3}{2}\sqrt{2} + 2}$ $\frac{8\sqrt{2} + 10}{\frac{3}{2}\sqrt{2} + 2} \times \frac{\frac{3}{2}\sqrt{2} - 2}{\frac{3}{2}\sqrt{2} - 2}$ $\frac{12\,(2) - 16\sqrt{2} + 15\sqrt{2} - 20}{\frac{9}{4}(2) - 4}$ $8 - 2\sqrt{2}$	P1 K1 K1 N1	**4**
11	(a)	Pembolehubah rawak Diskret kerana mempunyai nilai tersendiri.	N1	**1**
	(b)	$P(X > 15) = 0.13$ atau $P(X < 10) = 0.1$ $\frac{15-\mu}{\sigma} = 1.127$ atau $\frac{10-\mu}{\sigma} = -1.282$ Menyelesaikan persamaan serentak untuk memperoleh μ, σ $\sigma = 2.08$	K1 K1 K1 N1	**5**

		$\mu = 12.66$	N1	
12	(a)(i)	$(6-1)! = 5$ 120	N1	
	(ii)	$\frac{7!}{3!\,2!}$ 420	K1 N1	**3**
	(b)(i)	${}^4C_4 = 1$	N1	
	(ii)	$({}^6C_2 \times {}^4C_2)\ atau\ ({}^6C_3 \times {}^4C_1)\ atau\ {}^6C_4$ $90+80+15$ 185	K1 N1	**3**
13	(a)(i)	$2x-4<-10$ atau $2x-4>10$	K1	
		$x<-3$	N1	**3**
		$x>7$	N1	
	(a)(ii)	$f(-1) = \|2(-1)-4\| = 6$ $f(4) = \|2(4)-4\| = 4$ Koordinat $(-1,6)$ dan $(4,4)$ ditulis pada graf Paksi betul dan bentuk graf betul  Kodomain: $0 \le f(x) \le 6$	K1 N1 N1	**3**
	(b)	$f^2(x) = x-6$ $f^3(x) = x-9$ $f^4(x) = x-12$	K1	**2**

		$f^n(x) = x - 3n$	N1	
14	(a)	$\left(-4\underline{i} + 4\underline{j}\right)t + (50\underline{i} + 20\underline{j})$ $(50 - 4t)\underline{i} + (20 + 4t)\underline{j}$	K1 N1	**2**
	(b)	$\overrightarrow{OA} = \overrightarrow{OB}$ $t(6\underline{i} + 8\underline{j}) = (50 - 4t)\underline{i} + (20 + 4t)\underline{j}$ $6t = 50 - 4t$ $8t = 20 + 4t$ $t = 5$ Kapal A akan memintas kapal B selepas 5 jam pelayaran.	K1 K1 K1 K1 N1 N1	**6**
15	(a)	$kos\,(30^0 + 45^0)$ $\left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{2}}\right) - \left(\frac{1}{2}\right)\left(\frac{1}{\sqrt{2}}\right)$ $\frac{\sqrt{3}-1}{2\sqrt{2}} \times \frac{2\sqrt{2}}{2\sqrt{2}}$ $\frac{\sqrt{6}+\sqrt{2}}{4}$	K1 K1 K1 N1	**4**
	(b)	$tan\,A = \frac{3}{4}$ $tan\,B = \frac{12}{5}$ $\frac{\left(\frac{3}{4}\right) - \left(\frac{12}{5}\right)}{1 + \left(\frac{3}{4}\right)\left(\frac{12}{5}\right)}$ $-\frac{33}{56}$	K1 K1 K1 N1	**4**

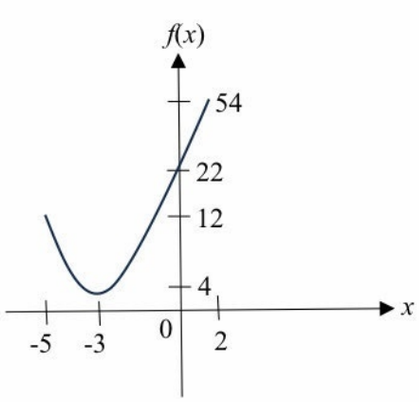
KERTAS 2

MATEMATIK TAMBAHAN

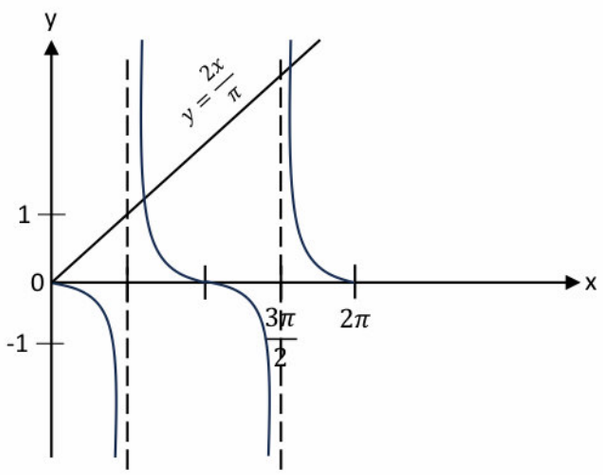
KERTAS 2

SKEMA PEMARKAHAN

SET 1

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
1			
	$p + q + r = 2100$	P1	
	$3p + 4q + 5r = 8600$	P1	
	$p + 1.50q + 1.50r = 2875$	P1	
	Hapus anu pertama dengan penggantian atau penghapusan $q + 2r = 2300$ @ $p - 2r = -200$ @ $2p + q = 1900$ @ setara	K1	
	Hapus anu kedua dengan penggantian atau penghapusan $1.50r = 1125$ @ $0.5\,p = 275$ @ $-5q = -4000$	K1	
	p= 550 @ q = 800 @ r = 750	N1	
	p = 550 DAN q = 800 @ p = 550 DAN r = 750 @ q = 800 DAN r = 750	N1	**7**
2			
(a)	$f(x) = 2\left[x^2 + 6x + \left(\frac{6}{2}\right)^2 - \left(\frac{6}{2}\right)^2 + 11\right]$	K1	
	$f(x) = 2(x+3)^2 + 4$	N1	
	$x = -3$	N1	
	nilai minimum = 4	N1	4
(b)			
	Bentuk graf $\vee$	P1	
	Dilihat domain graf $-5 \le x \le 2$, $(0,22)$ dan $(-3,4)$	N1	2
			6

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
3. (a)	Tulis hukum segitiga vektor bagi ΔAOB @ ΔAOP $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ @ $\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP}$	P1	
(i)	$\overrightarrow{AB} = -3\text{p} + 3\text{q}$	N1	
(ii)	$\overrightarrow{OP} = 2\text{p} + \text{q}$	N1	3
(b)(i)	$\overrightarrow{OX} = 2k\text{p} + k\text{q}$	N1	
(ii)	$\overrightarrow{AX} = 3hq$	N1	2
(c)	Samakan bentuk dan banding pekali $2kp + k\text{q} = 3\text{p} + 3hq$ DAN $2k = 3$ & $k = 3h$	K1	
	$k = \frac{3}{2}$, $h = \frac{1}{2}$	N1 N1	3
			8
4 (a)	Ganti $t = \frac{216}{\pi j^2}$ ke dalam persamaan $L = 2\pi j(t) + 8j^2$ $L = 2\pi j\left(\frac{216}{\pi j^2}\right) + 8j^2$	K1	
	Membezakan $L = \frac{432}{j} + 8j^2$	K1	
	$\frac{dL}{dj} = -\frac{432}{j^2} + 16j$	N1	
	Menyamakan $\frac{dL}{dj} = 0$ dan mencari nilai j $-\frac{432}{j^2} + 16j = 0$ dan $j = 3$	K1	
	Membezakan $\frac{dL}{dj} = -\frac{432}{j^2} + 16j$ dan ganti $j = 3$ $\frac{d^2L}{dj^2} = \frac{864}{(3)^3} + 16$	K1	
	$\frac{d^2L}{dj^2} = 48 > 0$, maka L adalah minimum pada $j = 3$	N1	**6**

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
5			
(a)	Guna $sek^2\,\theta = 1 + tan^2\theta$	P1	
	$2 \sin\theta \cos\theta$	N1	2
(b)(i)			
	Bentuk graf tangen Satu kitaran Graf negatif	P1 P1 P1	3
(ii)	$y = \frac{2x}{\pi}$	K1	
	Lakar dan label garis lurus $y = \frac{2x}{\pi}$	N1	
	Bilangan penyelesaian = 3	N1	3
			8

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
6(a)	$3.77p = 6p\theta$	K1	
	$\theta = 0.6283$	N1	
	$\frac{1}{2}(6p)^2(0.6283) = 45.24$	K1	
	$p = 2.000$	N1	4
(b)	$n = \frac{2(3.142)}{0.6283}$ @ $n = \frac{2(3.142)(6)(2)}{(3.77)(2)}$	K1	
	$n = 10$	N1	
	80 @ 26 (dilihat)	P1	
	$\frac{80}{100} \times 130$ ATAU $130 - 26 = 104$	K1	
	RM 104.00	N1	5
			9
7			
(a)	-345	N1	1
(b)	$T_1 = -48$	N1	
	$T_2 = S_2 - S_1 = \frac{3(2)(2-33)}{2} - (-48)$	K1	
	$d = 3$	N1	3
(c)	$-48 + (n-1)(3) > 0$	K1	
	$n = 18$	N1	2
			6

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
8 (a)	Beza $y = 3x^3 + 2$ terhadap x dan Ganti $x = 1$ ke dalam $\frac{dy}{dx}$ $\frac{dy}{dx} = 9(1)^2$	K1	
	Guna $m_1 m_2 = -1$ $9\,(m_2) = -1$ $m = -\frac{1}{9}$	K1	
	$y - 5 = -\frac{1}{9}(x - 1)$ @ $\left[y = -\frac{1}{9}x + c\right]$, $c = \frac{46}{9}$ $y = \frac{-1}{9}x + \frac{46}{9}$ @ setara	K1 N1	4
(b)	$x = \frac{4}{9}$ dilihat	K1	
	Kamir $3x^3 + 2$ dan guna had $\int_0^1$ ke dalam kamiran $3x^3 + 2$ $\left[\left(\frac{3(1)^4}{4} + 2(1)\right) - \left(\frac{3(0)^4}{4} + 2(0)\right)\right]$ ATAU Mencari luas segitiga $\frac{1}{2}(5)(\frac{5}{9})$ @ $\frac{1}{2}(4)(\frac{4}{9})$	K1	ATAU penyelesaian dengan menggunakan kamiran terhadap paksi -y
	$\left[\left(\frac{3(1)^4}{4} + 2(1)\right) - \left(\frac{3(0)^4}{4} + 2(0)\right)\right] - \frac{25}{18} + \frac{16}{18}$	K1	
	$\frac{9}{4}$ $unit^2$	N1	4
(c)	Kamir $\frac{\pi}{2}\int(3x^3 + 2)^2\,dx$ dan guna had $\int_0^1$ $\frac{\pi}{2}\left[\left(\frac{9(1)^7}{7} + 3(1)^4 + 4(1)\right) - \left(\frac{9(0)^7}{7} + 3(0)^4 + 4(0)\right)\right]$	K1	
	$isi\ padu = \frac{29}{4}\pi$ $unit^3$	N1	2
			10

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
9	$29.047 = \sqrt{1125(q)}$	K1	
(a)(i)	$q = 0.7500$	N1	
	75%	N1	
(ii)	$1 - P(X = 0) - P(X = 1)$ @ $P(X = 2) + P(X = 3) + \cdots + P(X = 10)$	K1	
	$1 - {}^{10}C_0(0.2500)^0(0.7500)^{10} - {}^{10}C_1(0.2500)^1(0.7500)^9$		
	0.7560	N1	5
(b)(i)	Tulis $P\left(z > \frac{38-40}{5}\right)$ & $1 - 0.3446$ **ATAU** Tulis $1 - P\left(z \leq \frac{38-40}{5}\right)$	K1	
	0.6554	N1	
(ii)	Tulis $P\left(z < \frac{n-40}{5}\right) = 0.2$ & $z = 0.842$ @ $z = -0.842$	K1	
	$-0.842 = \frac{n-40}{5}$	K1	
	$n = 35.79$ & maka $n = 35$	N1	5
			10
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No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
10 (a)(i)	Ganti S$(k, 5)$ ke dalam persamaan $y = x - 2$ @ setara (guna kecerunan) $5 = k - 2$ @ $1 = \frac{5-0}{k-2}$	K1	
	$k = 7$	N1	2
(ii)	Guna $m_1 \times m_2 = -1$ $m_2 = -1$	K1	
	$y - 5 = -1(x - 7)$ @ $[y = -x + c]$, $c = 12$ $y = -x + 12$	K1 N1	3
(b)(i)	$R(0,2)$ dilihat	P1	
	$\frac{1}{2}\|\,[(0)(5) + (7)(0) + (2)(2)] - [(2)(7) + (5)(2) + (0)(0)]\,\|$	K1	
	4×10 dan 40 unit^2	N1	3
(ii)	$\sqrt{(x-7)^2 + (y-5)^2} = 5$	K1	
	$x^2 + y^2 - 14x - 10y + 49 = 0$	N1	2
			10

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
11			
(a)	$log_{10} y$ | 0.6405 | 0.8814 | 1.002 | 1.243 | 1.363 | 1.477	N1	1
(b)	Graf garis lurus $log_{10}y$ melawan x dilukis -Paksi-paksi betul dan skala seragam dari titik pertama hingga titik terakhir -Sekurang-kurangnnya nya satu *titik diplot betul	K1	
	6 *titik diplot dengan betul Garis lurus penyuaian terbaik -Sekurang-kurangnya 5 *titik diplot	N1 N1	3
(c)(i)	$log_{10}y = (k\ log_{10}a)x + log_{10}h$	P1	
	Guna* $c = log_{10}h$	K1	
	$h = 2.512$	N1	
	Guna* $m = k\ log_{10}2$	K1	
	$k = 0.3986$	N1	5
(ii)	$y = 1.18$	N1	1
			10

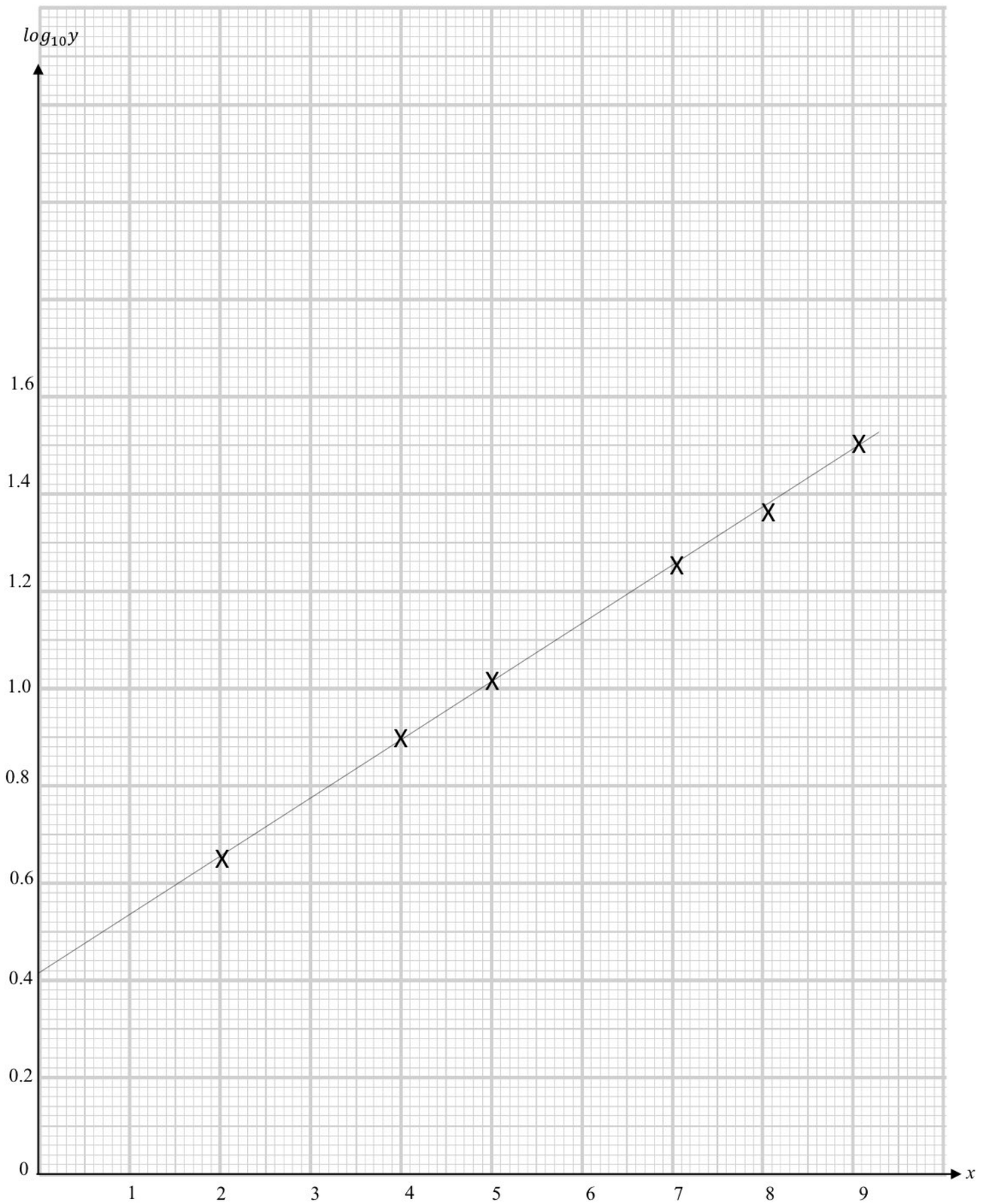
No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
12.			
(a)(i)	$\frac{UV}{\sin 35^\circ} = \frac{15}{\sin 75^\circ}$	K1	
	$UV = 8.907cm$	N1	
(ii)	$\angle VUT = 70^\circ$	P1	
	Guna hukum kos		
	$TV^2 = 15^2 + 8.907^2 - 2(15)(8.907)\ kos\ 70°$	K1	
	$TV = 14.59cm$		
	Mencari dan menambah luas segitiga VUT @ luas segitiga VWT	K1	
	$\frac{1}{2} \times 15 \times 8.907 \times sin70^\circ$ @ $\frac{1}{2} \times 8.907 \times 8.907 \times sin110^\circ$		
	$\frac{1}{2} \times 15 \times 8.907 \times sin70^\circ + \frac{1}{2} \times 8.907 \times 8.907 \times sin110^\circ$		
	100.05	N1	6
(b)	Guna teorem phytagoras : $SW^2 = 12^2 + 8.907^2$	K1	
	$SW = 14.94$		
	$\frac{sin\angle SPW}{14.94} = \frac{\sin 28^\circ}{10}$		
	Sudut cakah : $\angle SPW$=135.46°	N1	
	$\angle PSW = 180^\circ - 135.46^\circ - 28^\circ$		
	$\angle PSW = 16.54^\circ$		
	$\frac{PW}{\sin 16.54^\circ} = \frac{10}{\sin 28^\circ}$	K1	
	$PW = 6.064$		
	Panjang minimum rod aluminium = 6.064 m	N1	4
	Minimum length of the aluminium rod=6.064 m		**10**

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
13(a)	$I_{Santan} = 109$	P1	
	$\frac{3.00}{y} \times 100 = 109$ @ $\frac{6.00}{4.80} \times 100 = x$	K1 N1	
	$x = 125$ $y = 2.75$	N1	4
(b)	$\frac{125(150) + 109(150) + 105(100) + 120(m)}{150 + 150 + 100 + m} = 116$	K1	
	$m = 200\ g$	N1	2
(c)	$I_{26/24} = \frac{116}{100} \times \frac{116}{100} \times 100$ $I_{26/24} = 134.56$	K1	
	$\frac{H_{26}}{11.00} \times 100 = 134.56$ $H_{23} = 14.80$	K1	
	Harga Jualan = $\frac{125}{100} \times 14.80$ @ setara 18.50	K1 N1	4
			10

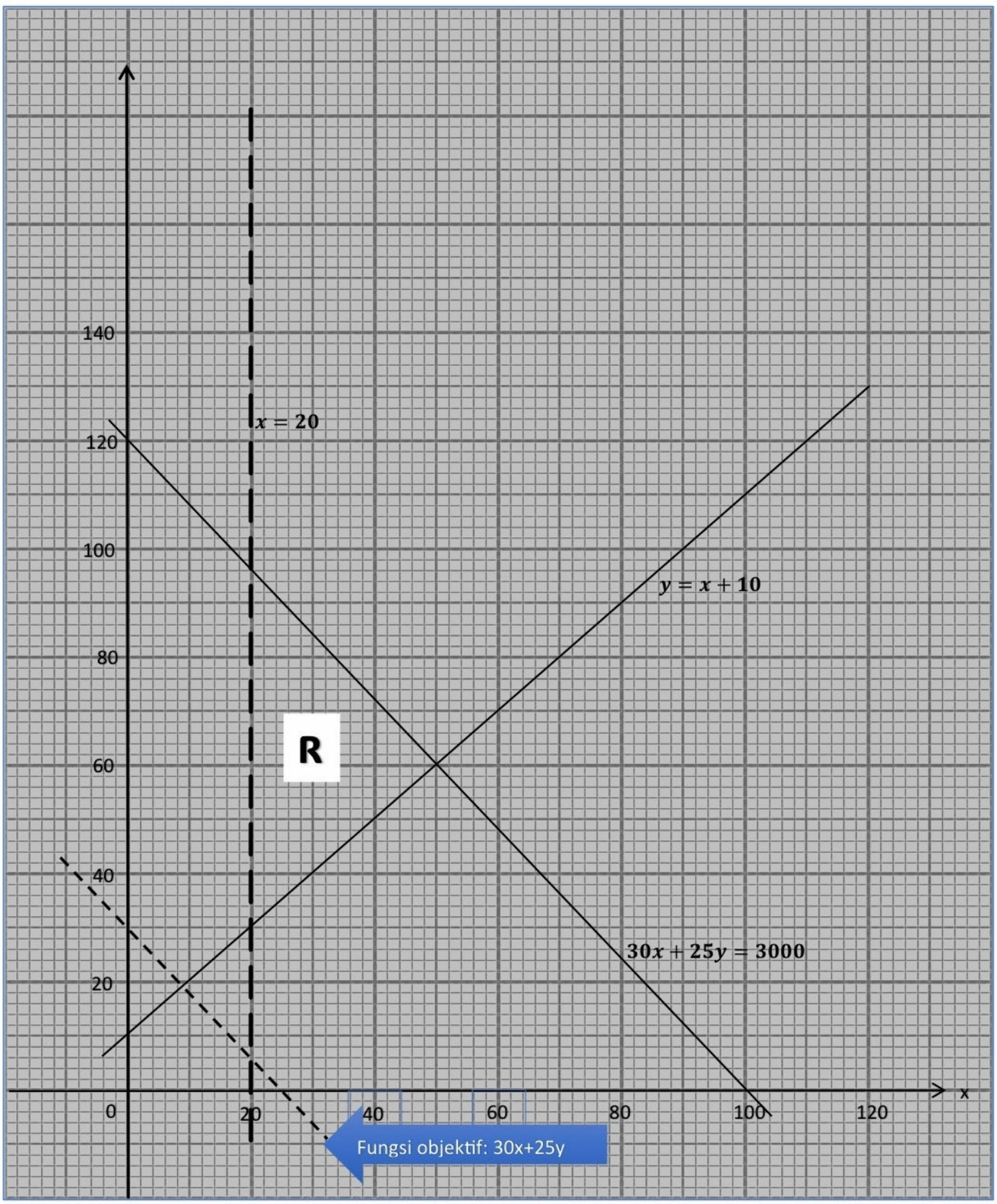
No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
14(a)	$30x + 25y \leq 3000$	N1	
	$x > 20$	N1	
	$y \geq x + 10$	N1	3
(b)	Lukis dengan betul sekurang[2]nya satu garis lurus dari *ketaksamaan yang melibatkan x dan y.	K1	
	Lukis dengan betul **semua** garis lurus dari *ketaksamaan yang melibatkan x dan y [Nota : Terima garis putus[2] dan garis padu]	K1	
	Rantau R dilabel dengan betul.	N1	3
(c)	$k = 30x + 25y$	N1	
	$(22,32)$	N1	
	Lukis $k = 30x + 25y$ dan Ganti mana-mana titik dalam rantau ke dalam $k = 30x + 25y$	K1	
	$30^*(22) + 25^*(32)$		
	$RM1460.00$	N1	4
			10

No.	Skema Pemarkahan	Sub Markah	Jumlah Markah
15(a)			
i)	$a = -2ms^{-2}$	N1	1
ii)	$8 - 2t = 0$	K1	
	$t = 4$	N1	2
iii)	$-t^2 + 8t = -20$	K1	
	$(t - 10)(t + 2) = 0$	K1	
	$t = 10$	K1	
	$v = 8 - 2(10) = -12ms^{-1}$	N1	4
(b)	$s_{OQ} = 8t - t^2$	K1	
	$pada\ t = 4, s_{OQ} = 8(4) - (4)^2$		
	$= 16$		
	$beza\ OP\ dan\ OQ = 20 - 16$	K1	
	$= 4m$	N1	3
			10

Soalan 11



Soalan 14 (b)


140
120
100
80
60
40
20
0
20
40
60
80
100
120
x
$x = 20$
$y = x + 10$
$30x + 25y = 3000$
R
Fungsi objektif: 30x+25y