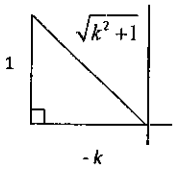
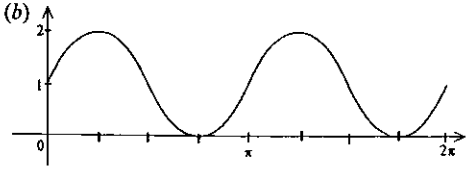
22	a) $-\frac{1}{k}$  Dilihat k pada rajah or $\tan y = \frac{1}{k}$	2 B1	4
	b) $\frac{k^2-1}{k^2+1}$ $1-2\left[\frac{1}{\sqrt{k^2+1}}\right]^2$	2 B1	
23	(a) $k = h+g$ (b) $n = 5$	1 1	2
24	(a) 6 (b) 12 ${}^2P_2 \times {}^3P_3$ or $2!\times 3!$	1 2 B1	3
25	48.46 $\frac{b-50}{1.04} = -1.484$ $P\left(X < \frac{b-50}{1.04}\right) = 0.0688$	3 B2 B1	3

BIL	Peraturan Pemarkahan (BAHAGIAN A)	Jumlah
1	$x = \frac{1+3y}{2}$ P1 $\frac{3}{\left(\frac{1+3y}{2}\right)} + \frac{2}{y} = 1$ atau $3y + 2\left(\frac{1+3y}{2}\right) = \left(\frac{1+3y}{2}\right)y$ K1 $6y + 2 + 6y = y + 3y^2$ $3y^2 - 11y - 2 = 0$ $\frac{-(-11) \pm \sqrt{(-11)^2 - 4(3)(-2)}}{2(3)}$ K1 $y = 3.840$; $y = -0.1736$ N1 $x = 6.261$; $x = 0.2396$ N1	5
2	(a) $120°$ P1 $\frac{2}{3}\pi$ rad (atau 2.095 radian) N1 (b) luas sector ACD $= \frac{1}{2}r^2\left(\frac{4}{3}\pi\right)$ K1 Luas $\Delta BAC = \frac{1}{2}r^2 \sin\frac{1}{3}\pi$ atau $\frac{1}{2}r^2 \sin 60°$ K1 Luas tembereng AC atau Luas tembereng AD $= \frac{1}{2}r^2\left(\frac{1}{3}\pi\right) - \frac{1}{2}r^2 \sin 60°$ K1 Luas kawasan berlorek $= \frac{1}{2}r^2\left(\frac{4}{3}\pi\right) - 2\left[\frac{1}{2}r^2\left(\frac{1}{3}\pi\right) - \frac{1}{2}r^2 \sin 60°\right]$ K1 $= \frac{1}{6}r^2\left(2\pi + 3\sqrt{3}\right)$ N1	7

BIL	Peraturan Pemarkahan (BAHAGIAN A)		Jumlah
3	(a) $(-2p)^2-4(p+1)(p-3)<0$	K1	7
	$p<-\frac{3}{2}$	N1	
	(b) (i) $-10=(p+1)(-1)^2-2p(-1)+p-3$	K1	
	$p=-2$	N1	
	$q=-5$	N1	
	(ii) $y=-\left[x^2-4x+\left(\frac{-4}{2}\right)^2-\left(\frac{-4}{2}\right)^2+5\right]$ atau setara	K1	
	$A(2,-1)$	N1	
4	(a) $y=-\frac{1}{2}x+5$	P1	7
	$x+2=-\frac{1}{2}x+5$	K1 try to solve equation	
	x = 2, y = 4	N1	
	Z(2, 4)	N1	
	(b) $\left(-\frac{1}{2}\right)(1)$ use $m_1 \times m_2$	K1	
	$-\frac{1}{2}$	N1	
	Not perpendicular because $m_1 \times m_2 \neq -1$	N1	

BIL	Peraturan Pemarkahan (BAHAGIAN A)		Jumlah
5	(a) $V=\pi j^2 h$		8
	$\frac{dV}{dh}=25\pi$	K1	
	$\frac{dh}{dt}=\frac{dh}{dv}\times 50\pi$		
	$\frac{dh}{dt}=\frac{1}{25\pi}\times 50\pi$	K1	
	$= 2$	N1	
	(b) $\pi(5)^2 h = 500\pi$	K1	
	$h =$ 20 cm	N1	
	(c) $\delta V \approx \frac{dV}{dh}\times \delta h$		
	$\delta V \approx 25\pi\times(p)$	K1 P1 untuk $\delta h = p$	
	$=25\pi p$	N1	
6	(a) 15	N1	7
	(b) (i) $m = 15$,	N1	
	(ii) q makin kecil	N1	
	(c) (i) $3(15) + 2 = 47$	N1	
	(ii) Julat = y – x	K1	
	Julat baharu = 3y – 3x	N1	

BIL	Peraturan Pemarkahan (BAHAGIAN B)	Jumlah
7	(a) $\frac{2(1-\sin^2 x)}{\frac{kos\,x}{\sin x}} = 2kos^2 x\left(\frac{\sin x}{kos\,x}\right)$ **K1 untuk identiti** $2\sin x\, kos\, x = \sin 2x$ **N1**	10
	(b)  P1 bentuk graf sin P1 amplitud P1 kalaan dlm 2π P1 anjakan ke atas sebanyak 1	
	(ii) $p-\left(\frac{2-2\sin^2 x}{kot\,x}\right)=5$ $p-(\sin 2x)=5$ **K1** $\sin 2x = p-5$ $1+\sin 2x = p-4$ **K1** **y = 0, p = 4** **N1** **y = 2, p = 6** **N1**	

BIL	Peraturan Pemarkahan (BAHAGIAN B)	Jumlah
8	(a) (i) m = 1 ; n = 1 **N1 , N1** (ii) B (2 , 0) **N1**	
	(b) (i) $\left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right]_0^1$ **K1** (kamiran sah) **K1** (guna had) $\frac{2}{3}$ unit^2 or setara **N1**	
	(ii) $\pi\int_0^1 x\ dx + \pi\int_1^2 (2-x)^2\ dx$ **K1** (menambah) $\pi\left[\frac{x^2}{2}\right]_0^1 + \pi\left[4x-2x^2+\frac{x^3}{3}\right]_1^2$ **K1** (kamiran sah) **K1** (guna had) $\frac{5}{6}\pi$ unit^3 **N1**	

x^2	1	4	9	16	25	36	N1
xy	3.40	4.60	6.99	9.40	13.40	18.00	N1

Paksi betul dengan skala yang seragam K1
Semua titik diplot betul N1
Garis penyuaian terbaik N1

(b) (i) apb $x = 4.5$, $xy = 11.40$

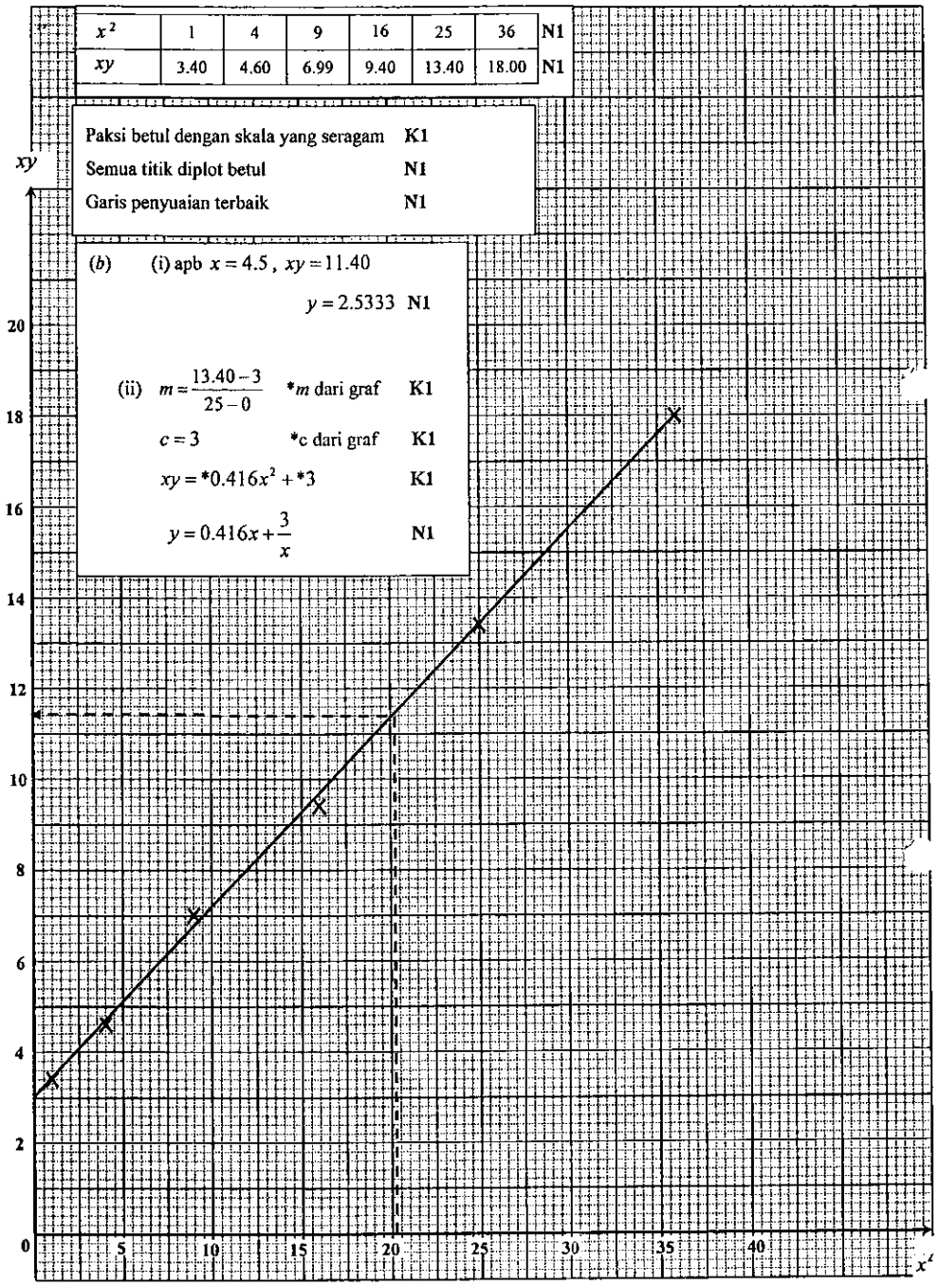
$y = 2.5333$ N1

(ii) $m = \dfrac{13.40-3}{25-0}$ *m dari graf K1

$c = 3$ *c dari graf K1

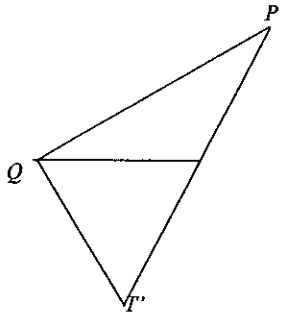
$xy = *0.416x^2 + *3$ K1

$y = 0.416x + \dfrac{3}{x}$ N1



BIL	Peraturan Pemarkahan (BAHAGIAN B)		Jumlah
10.	(a) $\overrightarrow{BS} = \overrightarrow{BR} + \overrightarrow{RS}$ or $\overrightarrow{PB} = \overrightarrow{PQ} + \overrightarrow{QB}$	K1	10
	$\overrightarrow{BS} = 2\underset{\sim}{x} - 9\underset{\sim}{y}$	N1	
	$\overrightarrow{PB} = -6\underset{\sim}{x} + 9\underset{\sim}{y}$	N1	
	(b) $\overrightarrow{BA} = h*\left(6\underset{\sim}{x} + 9\underset{\sim}{y}\right)$ in term of x, y and h.	K1	
	$\overrightarrow{BA} = \overrightarrow{BS} + k\overrightarrow{SR}$	K1	
	$\overrightarrow{BA} = 2\underset{\sim}{x} + (9k-9)\underset{\sim}{y}$	N1	
	$6h = 2$ or $9h = -9 + 9k$	K1	
	$h = \dfrac{1}{3}$	N1	
	$k = \dfrac{2}{3}$	N1	
	(c) $\overrightarrow{AP} = 2\overrightarrow{BA}$	N1	
11	(a) (i) $p = 0.65$, $q = 0.35$, $n = 6$		10
	atau $P(X \geq 5) = P(X = 5) + P(X = 6)$	P1	
	${}^6C_5 \times 0.65^5 \times 0.35^1 + {}^6C_6 \times 0.65^6 \times 0.35^0$	K1	
	0.3191	N1	
	(ii) $1 - P(X = 0) > 0.94$	K1	
	$\underline{n} = 2$	N1	
	(b) (i) $P\left(\dfrac{17-23.5}{4.1} < Z < \dfrac{23-23.5}{4.1}\right)$	K1	
	0.3949 or 0.39503	N1	
	(ii) $P\left(Z > \dfrac{17-23.5}{4.1}\right)$	K1	
	0.9435 @ 0.9436	N1	
	94.35 % @ 94.36%	N1	

BIL	Peraturan Pemarkahan (BAHAGIAN C)		Jumlah
12	(a) $\frac{99}{P_{13}}\times 100 = 120$	K1	
	82.50	N1	
	(b) A $\frac{120\times 95}{100} = 114$	N3,2,1,0	
	B $\frac{110\times 100}{100} = 110$		
	C $\frac{150\times 110}{100} = 165$		
	D $\frac{120\times 120}{100} = 144$		
	(c) i) $\frac{114(120)+110(60)+165(80)+144(100)}{120+60+80+100}$	K1 P1 untuk 100	
	$\frac{47880}{360}$		
	133	N1	
	ii) $\frac{425}{P_{13}}\times 100 = 133$	K1	
	319.55	N1	

BIL	Peraturan Pemarkahan (BAHAGIAN C)		Jumlah
13	(a) (i) $\frac{\sin T}{14} = \frac{\sin 40}{10}$	K1	
	$\angle QTP = 115.85°$	N1	
	(ii) $PR^2 = 14^2 + 22^2 - 2(14)(22)\cos 75.85°$	K1 P1 untuk 75.85°	
	$PR = 23.01$	N1	
	(iii) *luas* $PQR = \frac{1}{2}(14)(22)\sin 75.85°$ atau *luas* $PQT = \frac{1}{2}(14)(10)\sin 75.85°$	K1	
	Luas = 149.33 – 67.88	K1 menolak	
	= 81.45	N1	
	ATAU		
	$\frac{\sin R}{14} = \frac{\sin 75.85°}{23.01}$	K1 mencari $\angle PRT = 36.15°$	
	luas $PTR = \frac{1}{2}(12)(23.01)\sin 36.15°$	K1	
	= 81.44	N1	
		N1 Sudut QTP tirus N1 $\angle QTP = 64.15°$	

BIL	Peraturan Pemarkahan (BAHAGIAN C)	Jumlah
15		10

(a) $p(2)^2 + 2q(2) = 0$ or $2p(2) + 2q = 8$ K1

$2p = 8$ K1 selesaikan persamaan serentak

$q = -4$, $p = 4$ N1, N1

(b) $s = \frac{4t^3}{3} - 4t^2$ K1

$4t\,(t-3) = 0$ K1

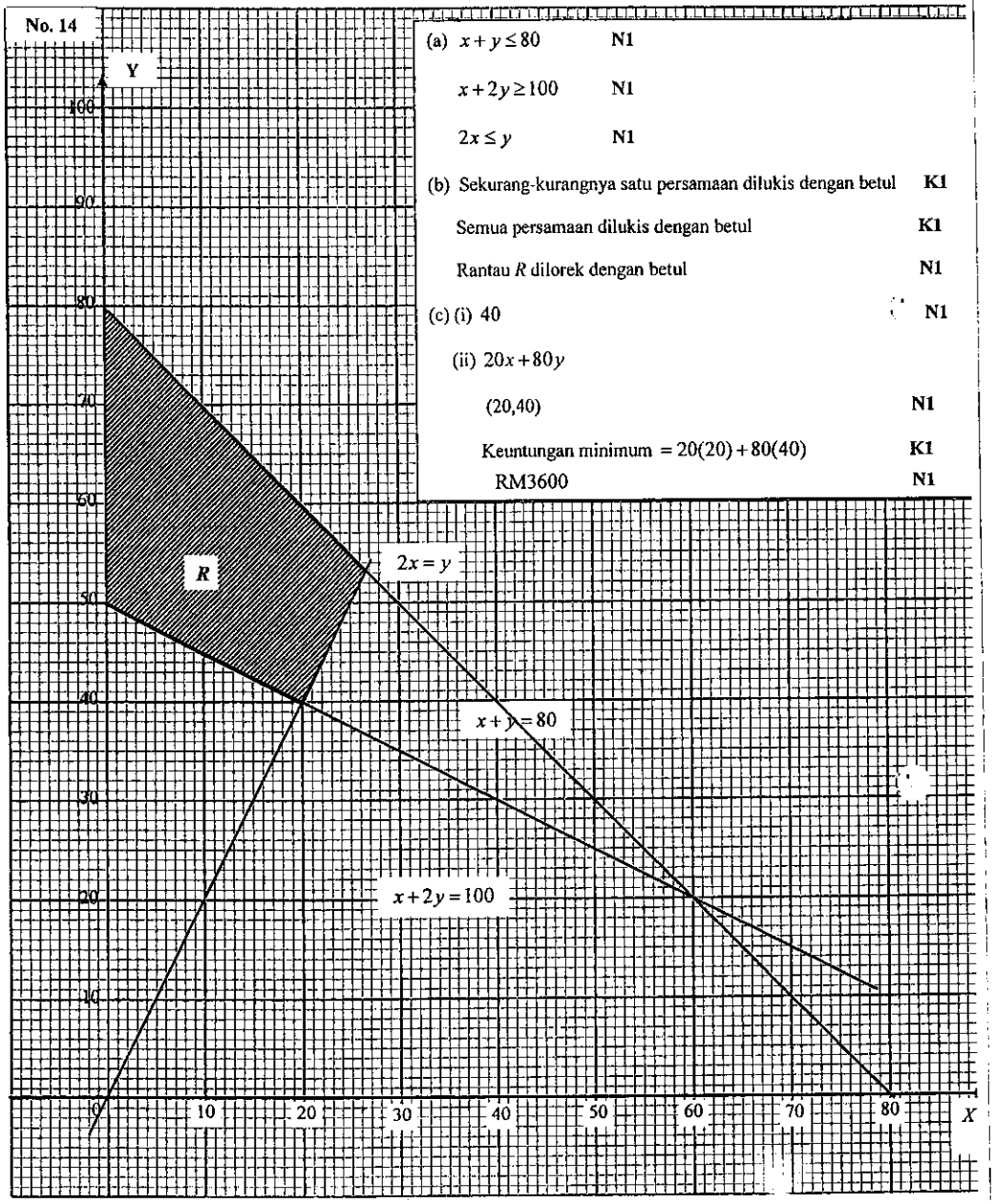
$t = 3$ N1

(c) $s_5 = \frac{4(5)^3}{3} - 4(5)^2$ *or* $s_4 = \frac{4(4)^3}{3} - 4(4)^2$ K1

$\left[\frac{4(5)^3}{3} - 4(5)^2\right] - \left[\frac{4(4)^3}{3} - 4(4)^2\right]$ K1 menolak

45.33 N1

No. 14



(a) $x + y \le 80$ N1

$x + 2y \ge 100$ N1

$2x \le y$ N1

(b) Sekurang-kurangnya satu persamaan dilukis dengan betul K1

Semua persamaan dilukis dengan betul K1

Rantau R dilorek dengan betul N1

(c) (i) 40 N1

(ii) $20x + 80y$

(20,40) N1

Keuntungan minimum $= 20(20) + 80(40)$ K1

RM3600 N1