MODUL PERKEMBANGAN PEMBELAJARAN
PEPERIKSAAN PERCUBAAN SPM 2024

MATEMATIK TAMBAHAN

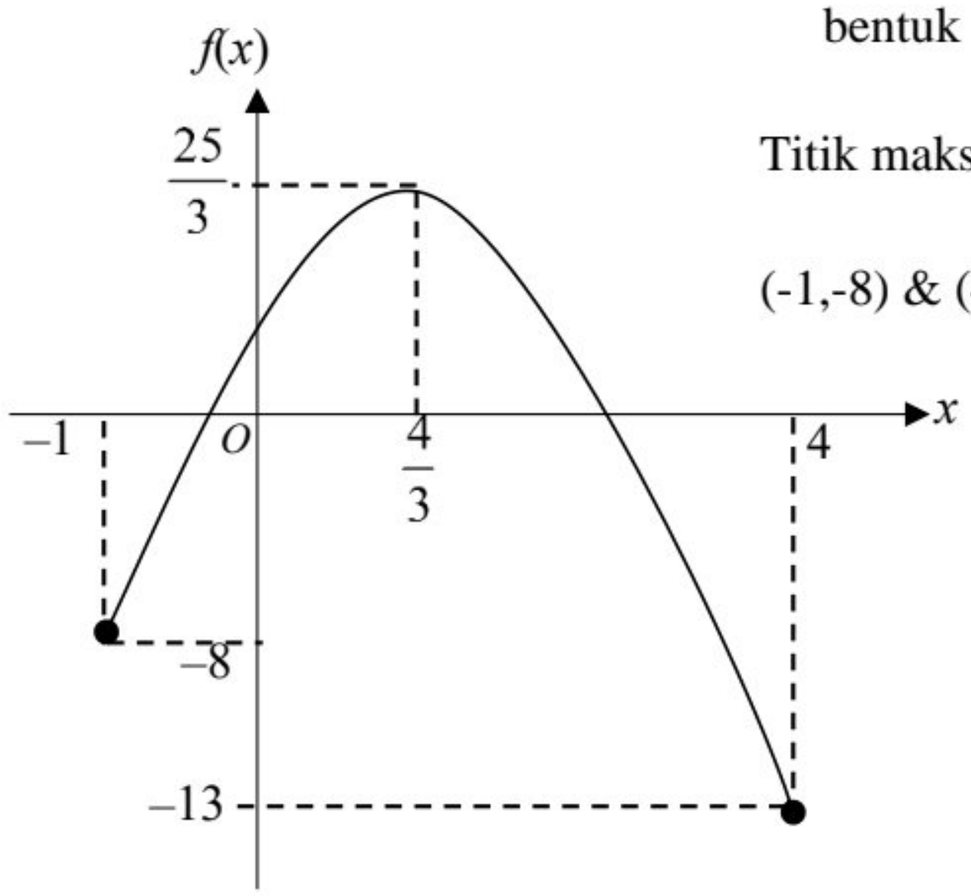
3472/2

Kertas 2

PERATURAN PEMARKAHAN

PERATURAN PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 2
PEPERIKSAAN PERCUBAAN SPM 2024

No	Peraturan Pemarkahan		Jumlah
1	(*a*) $\angle KOL = 60° \times \frac{\pi}{180°}$	**K1**	6
	$\frac{1}{3}\pi$	**N1**	
	(*b*) $\frac{1}{2}\left(12\sqrt{3}\right)^2\ ^*\left(\frac{1}{3}\pi\right)$	**K1**	
	$\frac{1}{2}\left(12\sqrt{3}\right)\left(12\sqrt{3}\right)\sin^*(60°)$	**K1**	
	$\frac{1}{2}\left(12\sqrt{3}\right)^2\ ^*\left(\frac{1}{3}\pi\right) - \frac{1}{2}\left(12\sqrt{3}\right)\left(12\sqrt{3}\right)\sin^*(60°)$	**K1**	
	39.16 (terima : $72\pi - 108\sqrt{3}$)	**N1**	
2	(*a*) $0.123 + 0.000123 + 0.000000123 + ...$	**P1**	8
	$\frac{0.123}{1-0.001}$	**K1**	
	$h = 41$	**N1**	
	(*b*) (i) $3\pi, 4.5\pi, 6.75\pi$	**P1**	
	(ii) $T_5 = 6(1.5^{5-1})$	**K1**	
	30.375	**N1**	
	(iii) $62.34375\pi = \frac{3\pi(1.5^n - 1)}{1.5-1}$	**K1**	
	$n = 6$	**N1**	

3	(*a*) $f(x)=-3\left(x^2-\frac{8}{3}x+\left(\frac{-\frac{8}{3}}{2}\right)^2-\left(\frac{-\frac{8}{3}}{2}\right)^2\right)+3$ **K1** $f(x)=-3\left(x-\frac{4}{3}\right)^2+\frac{25}{3}$ **N1** Nilai maksimum dan $\frac{25}{3}$ // $8\frac{1}{3}$ // 8.333 **N1** (*b*)  bentuk $\cap$ **P1** Titik maksimum $\left(\frac{4}{3},\frac{25}{3}\right)$ **dan** (-1,-8) & (4,-13) **P1** $-\frac{25}{3}\le f(x)\le 13$ **N1**		**6**
4	(*a*) $\frac{y-(-1)}{x-6}\times\frac{y-(-9)}{x-4}=-1$ **K1** $x^2+y^2-10x+10y+33=0$ **N1** (*b*) $(-4y-15)^2+y^2-10(-4y-15)+10y+33=0$ **K1** $(y+6)(y+4)=0$ **K1** $y=-6\ ,\ \ y=-4$ $x=9\ \ ,\ \ x=1$ $R(9,-6)$ **N1** $T(1,-4)$ **N1**		**6**

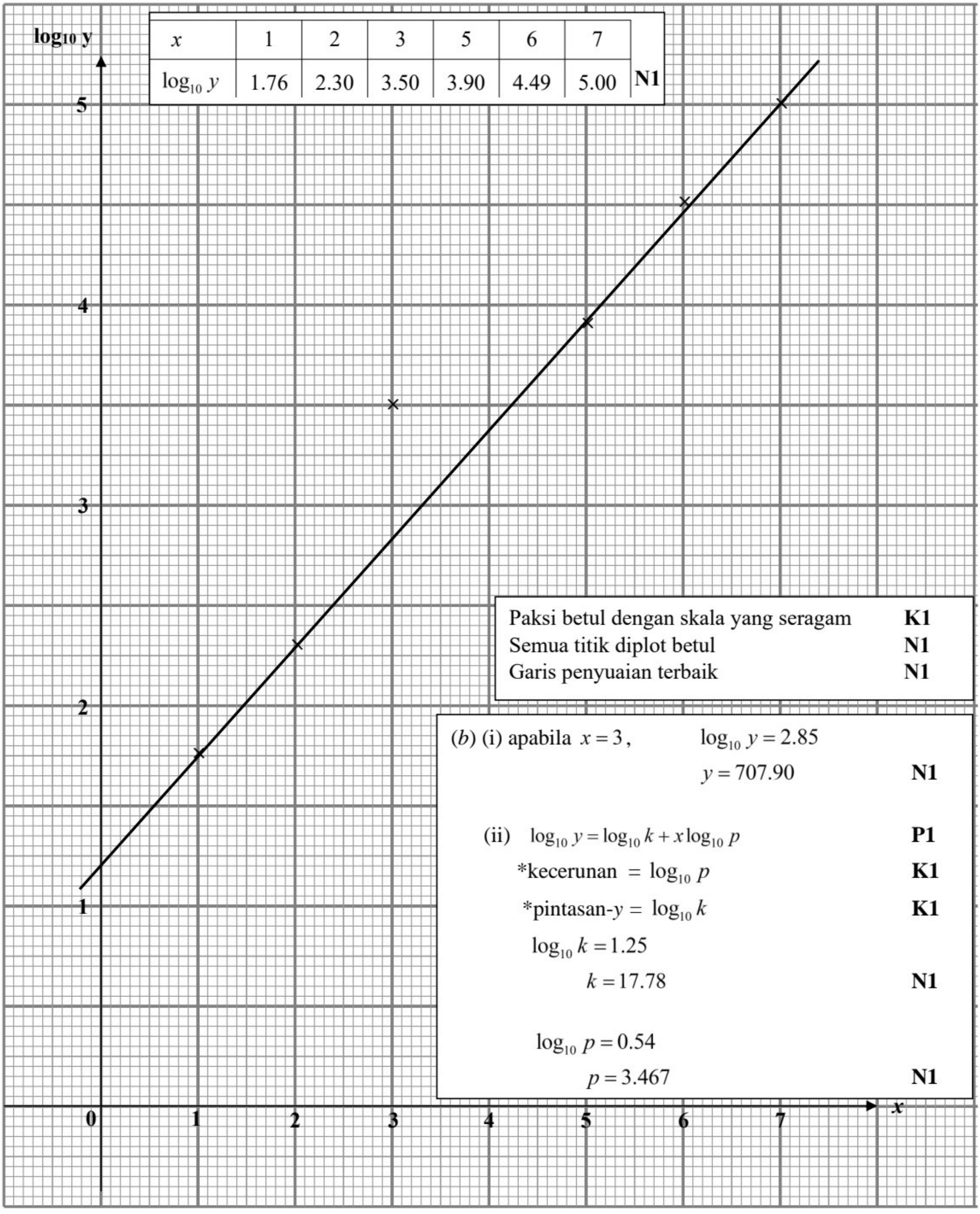
5	(*a*) (i) $a=2\ ,\ b=\dfrac{3}{2}$	**N1N1**	**8**
	(ii) 2	**N1**	
	Nota : **N0** jika pengiraan $y=2$ ***tidak*** ditunjukkan.		
	(*b*) (i) Guna $\cos 2x=2\cos^2 x-1$	**K1**	
	$2\sin x\cos x$		
	$\sin 2x$	**N1**	
	(ii) $\cos x(2\sin x+1)=0$	**P1**	
	$x=90^\circ,270^\circ$ or $x=210^\circ,330^\circ$	**K1**	
	$x=90^\circ,210^\circ,270^\circ,330^\circ$	**N1**	
6	(*a*) (i) $\left[\dfrac{4x^{-1}}{(-1)}\right]_2^k=4\left[\dfrac{4x^{-1}}{(-1)}\right]_k^8$	**K1**	**8**
	$\left[\left(-\dfrac{4}{k}\right)-\left(-\dfrac{4}{2}\right)\right]=4\left[\left(-\dfrac{4}{8}\right)-\left(-\dfrac{4}{k}\right)\right]$	**K1**	
	$k=5$	**N1**	
	(ii) $\left(-\dfrac{4}{8}\right)-\left(-\dfrac{4}{5*}\right)$	**K1**	
	$\dfrac{3}{10}$	**N1**	
	(*b*) $\pi\left[-\dfrac{16}{3x^3}\right]_2^8$	**K1**	
	$\pi\left[\left(-\dfrac{16}{3(8)^3}\right)-\left(-\dfrac{16}{3(2)^3}\right)\right]$	**K1**	
	$\dfrac{21}{32}\pi$	**N1**	

7	(*a*)	$x = 2y + 1$	**P1**	**8**
		$2(2y + 1)^2 + y^2 - 2(2y + 1) - 3y = 17$	**K1**	
		$y = \dfrac{-(1) \pm \sqrt{(1)^2 - 4(9)(-17)}}{2(9)}$	**K1**	
		$y = 1.320 , -1.431$	**N1**	
		$x = 3.640 , -1.862$	**N1**	
	(*b*)	$5 + a^2 - 14 = 0$	**P1**	
		$a - 3 = 0$	**P1**	
		$a = 3$	**N1**	

No. 8

x	1	2	3	5	6	7
$\log_{10} y$	1.76	2.30	3.50	3.90	4.49	5.00

N1



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

(*b*) (i) apabila $x = 3$, $\log_{10} y = 2.85$

$y = 707.90$ **N1**

(ii) $\log_{10} y = \log_{10} k + x \log_{10} p$ **P1**

*kecerunan $= \log_{10} p$ **K1**

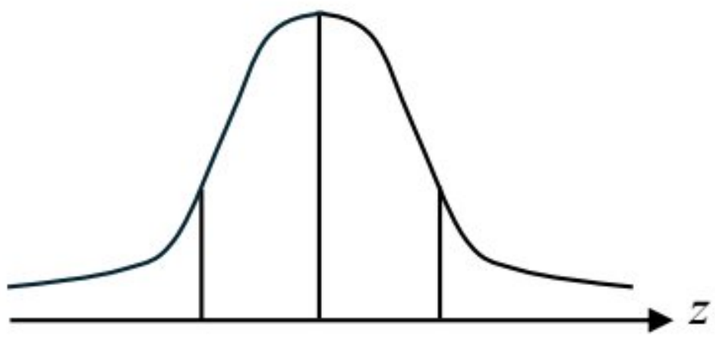
*pintasan-y $= \log_{10} k$ **K1**

$\log_{10} k = 1.25$

$k = 17.78$ **N1**

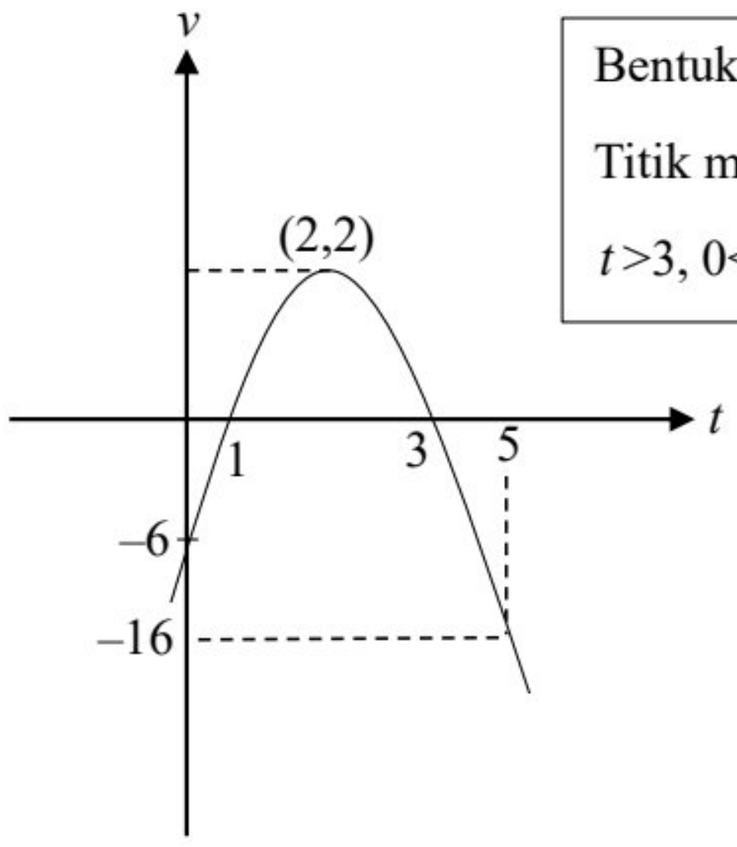
$\log_{10} p = 0.54$

$p = 3.467$ **N1**

9	(*a*) $^{10}C_8(0.85)^8(0.15)^2$ @ $^{10}C_9(0.85)^9(0.15)^1$ @ $^{10}C_{10}(0.85)^{10}(0.15)^0$	**K1**	
	$^{10}C_8(0.85)^8(0.15)^2 + {}^{10}C_9(0.85)^9(0.15)^1 + {}^{10}C_{10}(0.85)^{10}(0.15)^0$	**K1**	
	0.8202	**N1**	
	(*b*)(i) $P\left(Z < \dfrac{18.5-22.5}{3.2}\right)$	**P1**	
	0.1056	**N1**	
	(ii)		
	Lakar 	**P1**	**10**
	Nota : - Mempunyai 3 rantau - Paksi *z* dilabel - Garis lurus menggunakan alat tepi lurus		
	$P\left(\dfrac{18.5-22.5}{3.2} \le Z < \dfrac{m-22.5}{3.2}\right)$	**P1**	
	$z = 0.781$	**P1**	
	$\dfrac{m-22.5}{3.2} = 0.781$	**K1**	
	25	**N1**	
10	(*a*) (i) $\overrightarrow{ST} = \overrightarrow{SR} + \overrightarrow{RT}$	**K1**	
	$= -6\underset{\sim}{m} + 18\underset{\sim}{n}$	**N1**	
	(ii) $\overrightarrow{RV} = \dfrac{3}{2}\underset{\sim}{m} + \dfrac{27}{2}\underset{\sim}{n}$	**N1**	
	(*b*) $d\left(\dfrac{3}{2}\underset{\sim}{m} + \dfrac{27}{2}\underset{\sim}{n}\right) = 18\underset{\sim}{n} + e(2\underset{\sim}{m} - 7\underset{\sim}{n})$	**K1**	**10**
	$\dfrac{27}{2}d = 18 - 7e$ atau $\dfrac{3}{2}d = 2e$	**K1**	
	$e = \dfrac{18}{25}$, $d = \dfrac{24}{25}$	**N1, N1**	

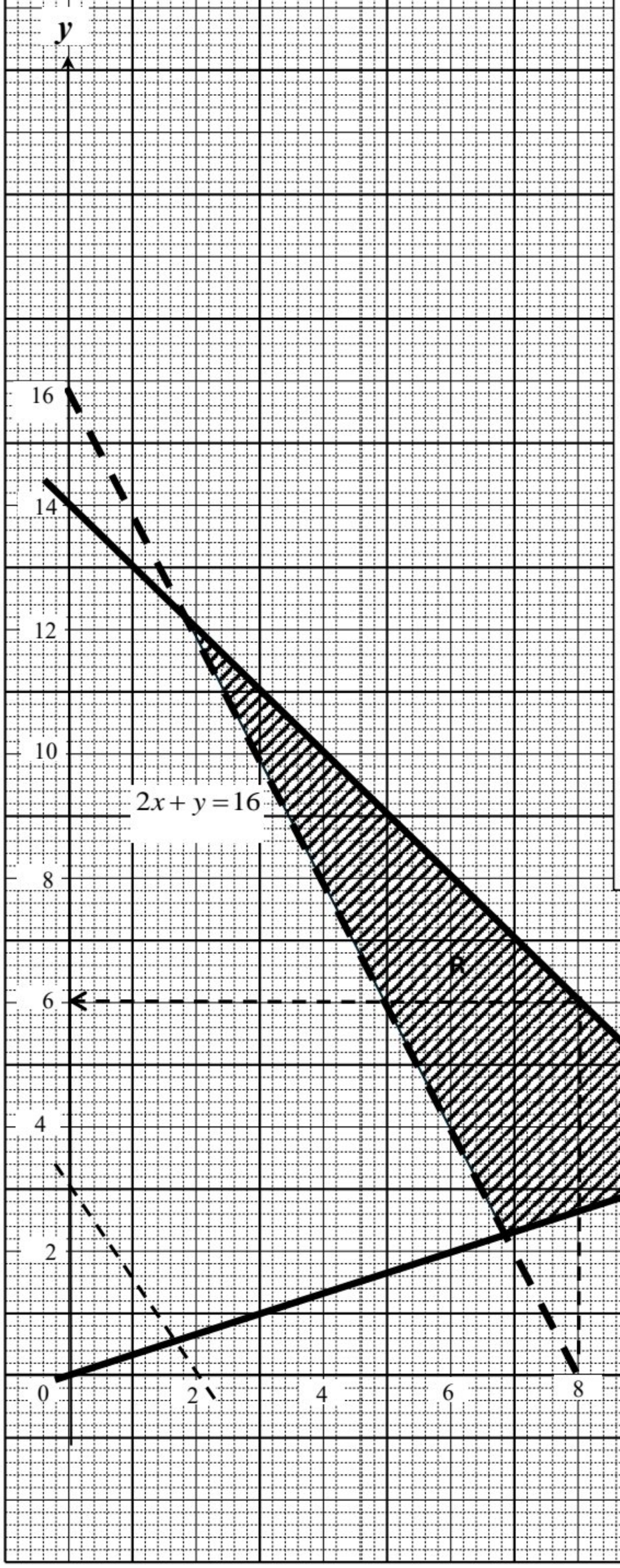
	(c) $\overrightarrow{RW} = \lambda \overrightarrow{RV}$ $g\underset{\sim}{m} + 2\underset{\sim}{n} = \lambda\left(\frac{3}{2}\underset{\sim}{m} + \frac{27}{2}\underset{\sim}{n}\right)$ **K1** $\frac{3}{2}\lambda = g$ atau $\frac{27}{2}\lambda = 2$ **K1** $g = \frac{2}{9}$ **N1**		
11	(a) 4 **N1** (b) guna $\frac{dy}{dx}$ dan ganti $x = 5$ $-2(5) + 4$ **K1** -6 **N1** (c) $m \times (-6) = -1$ **K1** $y - 7 = \left(\frac{1}{6}\right)(x - 5)$ @ setara **K1** $y = \frac{1}{6}x + \frac{37}{6}$ **N1** (d) guna $\frac{dy}{dx} = 0$ dan selesaikan $-2x + 4 = 0$ **K1** (2, 16) **N1** Bina jadual **K1** [table] titik maksimum **N1**		**10**

x	1.5	2	2.5
$\frac{dy}{dx}$	1	0	– 1
Tanda bagi $\frac{dy}{dx}$	+	0	–
Lakaran tangen			
Lakaran graf			

12	(*a*) (i) $-6=-m(0-2)^2+2$	K1	
	$m=2$	N1	
	(ii) $0=-2(t-2)^2+2$ dan selesaikan persamaan kuadratik	K1	
	$t=1, t=3$	N1	
	(*b*) 	Bentuk graf P1 Titik max (2,2), (0,-6) dan (5,-16) N1 $t>3$, $0<t<1$ N1	
	(*c*) $\int_2^3 -2t^2+8t-6dt$ @ $\left\lvert\int_3^5 -2t^2+8t-6dt\right\rvert$	kamir dan penggantian K1	
	$\int_2^3 -2t^2+8t-6dt+\left\lvert\int_3^5 -2t^2+8t-6dt\right\rvert$	penambahan K1	
	$\frac{44}{3}$	N1	
13	(*a*) $\frac{\sin T}{70}=\frac{\sin 50.69}{90}$	K1	
	$T=37^o$	N1	
	$TN^2=90^2+70^2-2(90)(70)kos92.31^\circ$	K1	
	$TN=116.22$	N1	
	(*b*) $kos37^\circ=\frac{TN}{90}$	K1	
	71.88	N1	

	(*c*) $\sin 50.69 = \frac{MA}{70}$ @ $\sqrt{70^2 - 44.34^2}$	K1	
	$MA = 54.16 / 54.15$	N1	
	$s = \frac{54.16 + 70 + 44.34}{2}$ dan		
	$L = \sqrt{84.25^{*}(84.25 - 54.16^{*})(84.25 - 70)(84.25 - 44.34)}$ ATAU setara	K1	
	$L = 1200.73$	N1	

No. 14



(*a*) I $x + y \leq 14$ **N1**

II $x \leq 3y$ **N1**

III $2x + y > 16$ **N1**

(*b*) Satu garis lurus dilukis dengan betul yang melibatkan x dan y. **K1**

Kesemua garis lurus dilukis dengan betul yang melibatkan x dan y. **K1**

Rantau R dilorek **N1**

(*c*) (i) $3 \leq y \leq 6$ **N1**

(ii) Menulis **dan** melukis fungsi objektif $k = 48x + 12y$ **N1**

Ganti (10,4) ke dalam $k = 48x + 12y$

$30(10) + 20(4)$ **K1**

380 **N1**

15	$(a)\quad p=\frac{9}{8}\times 100\ @\ \frac{q}{3}\times 100=105\ @\ \frac{4.80}{r}\times 100=120$	**K1**	
	$p=112.50,\ q=3.15,\ r=4.00$ (semua betul)	**N1N1**	
	Nota : 2 betul (N1)		
	$(b)\quad \frac{(112.5\times 20)+(105\times 30)+(108\times 10)+(120\times 40)}{20+30+10+40}$	**K1 K1**	
	112.80	**N1**	**10**
	$(c)\quad \frac{C_{23}}{43}\times 100=112.8$	**K1**	
	48.50	**N1**	
	$(d)\quad \frac{112.8\times 110}{100}$	**K1**	
	124.08	**N1**	

PERATURAN PEMARKAHAN TAMAT