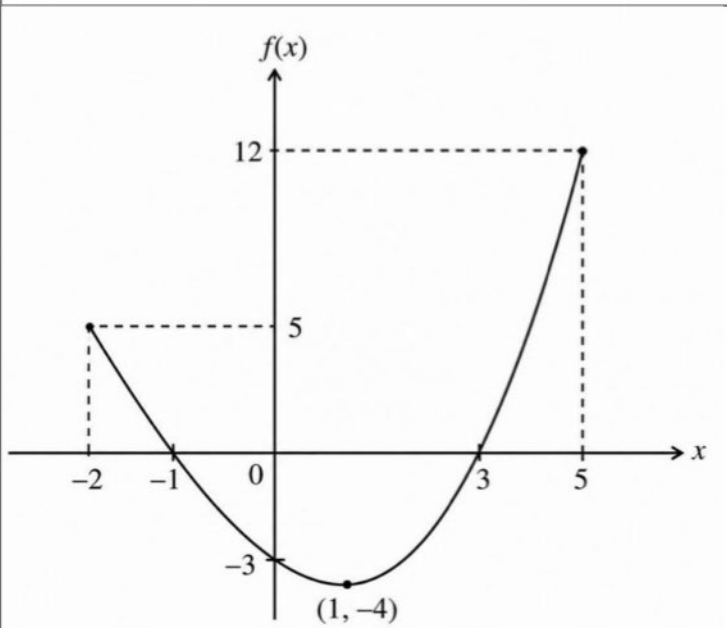
PENYELESAIAN / *SOLUTIONS:*

KERTAS 1 / *PAPER 1*:

No			Skema Pemarkahan	Sub Markah	Jumlah Markah
1	(a)		$f(x) = x^2 - 2x + \left(\frac{-2}{2}\right)^2 - \left(\frac{-2}{2}\right)^2 - 3$	**1**	
			$f(x) = (x-1)^2 - 4$	**1**	
			$a > 0$, nilai minimum / *minimum value* $= -4$	**1**	
	(b)				
			* Graf bentuk ∪ dijumpai & paksi-x dan paksi-$f(x)$ dilukis dengan pembaris & x, $f(x)$ dan asalan dilabel *U-shaped graph is obtained* & *x-axis and f(x)-axis are drawn with ruler* & x, $f(x)$ *and origin are labelled*	**1**	
			* Titik minimum & 2 titik yang lain (1 kiri, 1 kanan) & Graf dalam domain $-2 \leq x \leq 5$. **The minimum point and two other points (one on the left and one on the right) are shown, for the graph in the domain* $-2 \leq x \leq 5$.	**1**	
			$-4 \leq f(x) \leq 12$	**1**	

2	(a)		$\frac{p^n}{(a+b)^m} - \frac{p^{n-1}}{(a+b)^{m-1}}$ $= \frac{p^n}{(a+b)^m} - \frac{p^n \cdot p^{-1}}{(a+b)^m (a+b)^{-1}}$ atau/*or* $\frac{p^n}{(a+b)^m} - \frac{\frac{p^n}{p}}{\frac{(a+b)^m}{(a+b)}}$ *Hukum indeks diaplikasikan/ *Law of indices are applied* $= \frac{p^n - p^{n-1}(a+b)}{(a+b)^m}$ atau/*or* $\frac{p^n(p-(a+b))}{p(a+b)^m}$ $= \frac{p^{n-1}}{(a+b)^m}(p-a-b)$	**1** **1** **1**	
	(b)		$\frac{\left(\frac{2}{\sqrt{x}}+3x\sqrt{x}\right)\sqrt{x}}{\left(2\sqrt{x}+\frac{4}{\sqrt{x}}\right)\sqrt{x}} = x+1$ $\frac{2+3x^2}{2x+4} = x+1$ $x^2 - 6x - 2 = 0$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-2)}}{2(1)}$ $x = 3 \pm \sqrt{11}$ $x > 0,\ x = 3 + \sqrt{11}$ atau/*or* 6.317	**1** **1** **1**	**6**
3			$\log_a x^2 - \log_a 4 = \log_a (y-1)$ $\log_a \frac{x^2}{4} = \log_a (y-1)$ $\frac{x^2}{4} = y - 1$ $x = \sqrt{4(y-1)}$ $x = 2\sqrt{y-1}$	**1** **1** **1** **1**	**4**
4	(a)		${}^nC_n = \frac{n!}{n!(n-n)!}$ $= 1$	**1** **1**	
	(b)		$k = 1, 2, 3, 4, 5, 6, 7, 8$	**1**	
	(c)		$n = x + (2x - 3)$ $n = 3x - 3$	**1** **1**	**5**
5	(a)		$3! \times 4! \times 2! \times n! = 1728$ $288 \times n! = 1728$ $n! = 6$ $n = 3$	**1** **1**	
	(b)	(i)	${}^4C_2 \times {}^2C_1 \times {}^3C_1$ @ ${}^4C_1 \times {}^2C_2 \times {}^3C_1$ @ ${}^4C_1 \times {}^2C_1 \times {}^3C_2$ 72	**1** **1**	

		(ii)	${}^4C_3 \times {}^5C_1 + {}^4C_4 \times {}^5C_0$	1	
			21	1	6
6	(a)	(i)	$\frac{1}{2} = \frac{2}{x+1}$	1	
			$x = 3$	1	
		(ii)	$x = \frac{2}{x+1}$	1	
			$(x-1)(x+2) = 0$		
			$x = 1, x = -2$	1	
	(b)	(i)	$g\left[\frac{2}{x+1}\right] = \frac{4-2x}{x+1}$		
			$Let\ y = \frac{2}{x+1}$		
			$x = \frac{2-y}{y}$ @ $x = \frac{2}{y} - 1$		
			$g(y) = \frac{4-2\left(\frac{2}{y}-1\right)}{\frac{2}{y}-1+1}$	1	
			$g(x) = 3x - 2$	1	
		(ii)	Ya, kerana fungsi *g* merupakan fungsi satu dengan satu.	1	
			Yes, because g is a one-to-one function.		7
7	(a)		$2\pi rh + 2\pi r^2 = 300$		
			$h = \frac{150 - \pi r^2}{\pi r}$ (tertunjuk/ *shown*)	1	
	(b)		$V = \pi r^2\left(\frac{150-\pi r^2}{\pi r}\right)$		
			$V = 150r - \pi r^3$	1	
			$\frac{dV}{dr} = 150 - 3\pi r^2$		
			$150 - 3\pi r^2 = 0$	1	
			$r = \sqrt{\frac{50}{\pi}} \approx 4$		
			$r = 4, h = 8$	1	
			Isipadu maksimum / *Maximum volume*		
			$3.142(4)^2(8) = 402.176\ \text{cm}^3$	1	5
8	(a)	(i)	$cos^{-1}\left(\frac{32}{40}\right)$ atau/ *or* $36.87°$ or $2 \times 36.87°$	1	
			$\approx 1.29rad$ (tertunjuk / *shown*)	1	

		(ii)	S = 40(1.29) = 51.6 cm	 **1**	
	(b)		Luas segmen *AXB* / *Area of segment AXB* $= \frac{1}{2}(40)^2(1.29) - \frac{1}{2}(40)(40)\sin 73.74^o$ = 264.00 cm^2 Luas keratan rentas di bawah permukaan air / *Area of the cross-section below the water surface* $= \pi(40)^2 - 264.00$ = 4763.20 cm^2	**1** **1** **1**	
	(c)		$\frac{4763.20 \times t}{3.142 \times 40^2 \times t} \times 100\%$ 94.75%	**1** **1**	**8**
9	(a)		$y = 2\left(\frac{1}{x^2}\right) + 3$ $X = \frac{1}{x^2}$ dan $Y = y$	**1** **1**	
	(b)		Kecerunan / *Gradient* = 2 Pintasan-*Y* / *Y-intercept* = 3	**1** **1**	**4**
10	(a)		$P\left(\frac{\mu-\sigma-\mu}{\sigma} < Z < \frac{\mu+\sigma-\mu}{\sigma}\right)$ $= P(-1 < Z < 1)$ $= 1 - 2P(Z \geq 1)$ dan / *and* $= 1 - 2(0.1587)$ $= 0.6826$ $m = 68.26$	 **1** **1**	
	(b)		$P\left(\frac{47-55}{8} < Z < \frac{63-55}{8}\right)$ $= P(-1 < Z < 1)$ $= 0.6826$	 **1**	
	(c)		0.6826×500 341	**1** **1**	**5**
11			$f'(x) = \frac{(1-2x)(2) - (2x)(-2)}{(1-2x)^2}$ $= \frac{2}{(1-2x)^2}$ $\int_1^2 -\frac{3}{(1-2x)^2}\,dx = -\frac{3}{2}\int_1^2 \frac{2}{(1-2x)^2}\,dx$	**1** **1**	

			$= -\frac{3}{2}\left[\frac{2x}{1-2x}\right]_1^2$ $= -\frac{3}{2}\left[\frac{2(2)}{1-2(2)} - \frac{2(1)}{1-2(1)}\right]$ $= -1$	 **1** **1**	**4**
12	(a)		titik tengah / *midpoint AD* $= \left(\frac{1+5}{2}, \frac{5+(-1)}{2}\right)$ $= (3, 2)$ $\overrightarrow{OB} = 3\underline{i} + 2\underline{j}$ $\overrightarrow{BC} = \overrightarrow{BO} + \overrightarrow{OA} + \overrightarrow{AC}$ $= -3\underline{i} - 2\underline{i} + (\underline{i} + 5\underline{i}) + (9\underline{i} + 3\underline{j})$ atau setara/ *or equivalent* $= 7\underline{i} + 6\underline{j}$	 **1** **1**	
	(b)		$\left\|\overrightarrow{BC}\right\| = \sqrt{7^2 + 6^2} = \sqrt{85}$ $\widehat{\overrightarrow{BC}} = \frac{7\underline{i}+6\underline{j}}{\sqrt{85}}$ $= \frac{7}{\sqrt{85}}\underline{i} + \frac{6}{\sqrt{85}}\underline{j}$ atau / *or* $= \frac{7\sqrt{85}}{85}\underline{i} + \frac{6\sqrt{85}}{85}\underline{j}$	**1** **1**	**4**
13	(a)		A (0, 3)	**1**	
	(b)	(i)	$y = \frac{1}{2}x + 3$ *dilihat / *seen* $m = \frac{1}{2}$ $\frac{1}{2}m_1 = -1$ atau setara / *or equivalent*, *dilihat / *seen* $y - 6 = -2(x - 6)$ $y = -2x + 18$ $\div 18$: $\frac{y}{18} = -\frac{2x}{18} + \frac{18}{18}$ $\frac{x}{9} + \frac{y}{18} = 1$	 **1** **1** **1** **1**	
		(ii)	$1 = -2(6) + 18$ $1 \neq 6$ dan / *and* Tidak / *No*.	 **1**	
	(c)		$BC : BD = 2 : 5$ $\frac{5(7) + 2(x)}{2 + 5} = 6$ atau / *or* $\frac{5(4) + 2(y)}{2 + 5} = 6$ atau/ *or* setara/ *equivalent* $D\left(\frac{7}{2}, 11\right)$	 **1** **1**	**8**
14	(a)	(i)	$T_9 = 25000(0.92)^{9-1}$ = RM12830.47	**1** **1**	

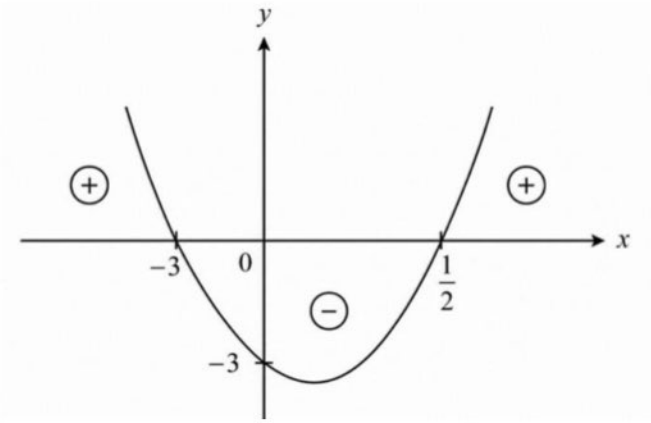
		(ii)	25000 – 12830.47 = RM12169.53	**1** **1**	
	(b)		$T_5 = 324$ $(4)(r)^{5-1} = 324$ $r = 3$ $\frac{4(3^n - 1)}{3 - 1} = 13120$ $3^n = 6561$ $= 3^8$ $n = 8$	 **1** **1** **1** **1**	**8**
15	(a)	(i)	$\sin\lambda = \frac{1}{\sqrt{1+p^2}}$ atau / *or* $\cos\lambda = \frac{p}{\sqrt{1+p^2}}$ $\text{kosek}\,(180° + \lambda) = -\frac{1}{\sin\lambda}$ $\text{cosec}\,(180° + \lambda) = -\frac{1}{\sin\lambda}$ @ $\text{kosek}\,(180° + \lambda) = \frac{1}{\sin 180°\cos\lambda + \cos 180°\sin\lambda}$ $\text{cosec}\,(180° + \lambda) = \frac{1}{\sin 180°\cos\lambda + \cos 180°\sin\lambda}$ $-\sqrt{1+p^2}$	**1** **1** **1**	
		(ii)	$\text{sek}\,(360° - \lambda) = \frac{1}{\cos\lambda}$ $\text{sec}\,(360° - \lambda) = \frac{1}{\cos\lambda}$ @ $\text{sek}\,(360° - \lambda) = \frac{1}{\cos 360°\cos\lambda + \sin 360°\sin\lambda}$ $\text{sec}\,(360° - \lambda) = \frac{1}{\cos 360°\cos\lambda + \sin 360°\sin\lambda}$ $\frac{\sqrt{1+p^2}}{p}$	 **1** **1**	
	(b)		$\cos\theta - \cos\theta\,(1 - \cos^2\theta) = 0$ @ $\cos\theta\,(1 - sin^2\theta) = 0$ $\cos\theta = 0$ $\theta = 90°$ @ $\frac{\pi}{2}$ $\theta = -\frac{\pi}{2}$ dan/*and* $\frac{\pi}{2}$	**1** **1** **1**	**8**

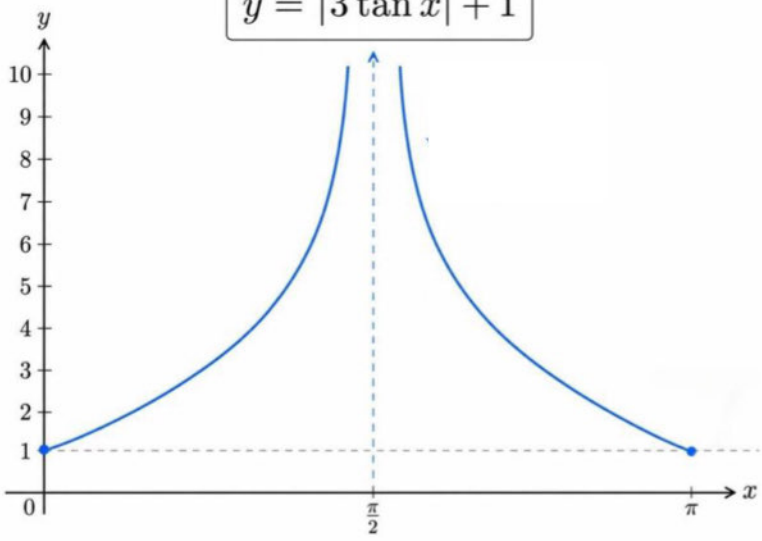
PENYELESAIAN / *SOLUTIONS:*

KERTAS 2 / *PAPER 2*:

No			Skema Pemarkahan	Sub Markah	Jumlah Markah
1	(a)		$\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP}$ or $\overrightarrow{OP} = \overrightarrow{OC} + \overrightarrow{CP}$ $= \overrightarrow{OA} + \frac{3}{5}\overrightarrow{AC}$ $= \overrightarrow{OC} + \frac{2}{5}\overrightarrow{CA}$ $= \overrightarrow{OA} + \frac{3}{5}(\overrightarrow{AO} + \overrightarrow{OC})$ $= \overrightarrow{OC} + \frac{2}{5}(\overrightarrow{CO} + \overrightarrow{OA})$ $= \underline{a} + \frac{3}{5}(-\underline{a} + \underline{c})$ $= \underline{c} + \frac{2}{5}(-\underline{c} + \underline{a})$ $= \frac{2}{5}\underline{a} + \frac{3}{5}\underline{c}$ $= \frac{2}{5}\underline{a} + \frac{3}{5}\underline{c}$	**1** **1**	
	(b)		$\overrightarrow{OP} = \frac{2}{5}\overrightarrow{OB}$ $= \frac{2}{5}\underline{b}$ $\frac{2}{5}\underline{b} = \frac{2}{5}\underline{a} + \frac{3}{5}\underline{c}$ $2\underline{b} = 2\underline{a} + 3\underline{c}$ (tertunjuk / *shown*)	**1** **1** **1**	
	(c)		$\overrightarrow{AC} = \overrightarrow{AO} + \overrightarrow{OC} = -\begin{pmatrix}6\\k\end{pmatrix} + \begin{pmatrix}4\\-1\end{pmatrix} = \begin{pmatrix}-2\\-k-1\end{pmatrix}$ $-k - 1 = 0$ dan / *and* $k = -1$	**1** **1**	**7**
2			Katakan / *Let* x = amaun pelaburan amanah saham / *investment amount unit trust* y = amaun pelaburan bon korporat / *investment amount corporate bond* z = amaun pelaburan simpanan tetap / *investment amount fixed deposit* $x + y + z = 200\,000$ ----------(1) $0.05x + 0.04y + 0.02z = 5\,850$ ------(2) $z = 3(x + y) - 80\,000$ $z = 3x + 3y - 80\,000$ ----------(3) Ganti / *Substitute* (3) ke dalam / *into* (1): $x + y + (3x + 3y - 80\,000) = 200\,000$ $4x + 4y = 280\,000$ $y = 70\,000 - x$ ----------(4)	**2 (semua betul / *all correct*)** **1 (2 betul / *correct*)** **1**	

			Ganti / *Substitute* (3) ke dalam / *into* (2): $0.05x + 0.04y + 0.02(3x + 3y - 80\,000) = 5\,850$ $0.11x + 0.10y = 7\,450$ ----------(5) Ganti / *Substitute* (4) ke dalam / *into* (5): $0.11x + 0.10(70000 - x) = 7\,450$ $x = 45\,000$ $y = 25\,000$ $z = 130\,000$	**1** **1** **1** **1**	**7**
3	(a)		Jarak yang dilalui oleh lengan robotik: *Distance travelled by robotic arm*: $S_{10} = \frac{10}{2}[2(120) + (10-1)(-5)]$ = 5(240 - 45) = 975 cm = 9.75 m Jarak yang dilalui oleh bungkusan: *Distance travelled by package*: $S_{10} = \frac{10}{2}[2(50) + (9)(-2)]$ = 5(100 – 18) = 4.10 Beza / *Difference* = 9.75 – 4.10 = 5.65 m 10−5.65 atau / *or* (10 + 4.10) – 9.75 = 4.35 m	**1** **1** **1** **1**	
	(b)		Jarak dari bungkusan ke stesen pemprosesan = 494 cm *Distance for the package to the processing station = 494 cm* $\frac{n}{2}[2(50) + (n-1)(-2)] = 494$ $\frac{n}{2}(102 - 2n) = 494$ $n^2 - 51n + 494 = 0$ $n = \frac{-(-51) \pm \sqrt{(-51)^2 - 4(1)(494)}}{2(1)}$ @ $(n-13)(n-38) = 0$ n = 13, 38	**1** **1**	

			Jumlah masa yang diambil oleh lengan robot hingga berhenti / *The total time taken by the robotic arm until it stops* $a = 120, d = -5$ $120 + (n-1)(-5) = 0$ $n = 25$ (38 > 25, maka / *so* 38 ditolak / *rejected*) Jarak yang dilalui oleh robot dalam masa 13 saat *Distance travelled by the robot in 13 seconds* $= \frac{13}{2}[2(120) + (13-1)(-5)]$ $= 1170$ Oleh kerana 1170 < 1494, lengan robotik tidak berjaya mencapai bungkusan tersebut sebelum ia memasuki stesen pemprosesan *Since* 1170 < 1494, *the robotic arm does not successfully reach the package before it enters the processing station*.	**1** **1**	**8**
4	(a)		$(2x-1)(x+3) \geq 0$ $x = \frac{1}{2}$ atau /or $x = -3$  $x \leq -3$ *atau / or* $x \geq \frac{1}{2}$	**1** **1**	
	(b)	(i)	$f(x) = 2x^2 - 4mx + m + 6$ $x = 2$ $2(2)^2 - 4m(2) + m + 6 = 0$ $m = 2$	**1** **1**	
		(ii)	$2x^2 - 4mx + m + 6 = 3$ $2x^2 - 4mx + m + 3 = 0$ $(-4m)^2 - 4(2)(m+3) = 0$ $16m^2 - 8m - 24 = 0$ $2m^2 - m - 3 = 0$ $(2m-3)(m+1) = 0$ $m = \frac{3}{2}, -1$	**1** **1**	**6**

5	(a)		$7 = 10 \times \angle SWT$ $\angle SWT = \frac{7}{10} = 0.7$ $25° = \frac{25(3.142)}{180} = 0.4364\ rad$ $\theta = 0.7 + 0.4364$ $= 1.136$	**1** **1** **1**	
	(b)		$A = \frac{1}{2}(8)^2(1.136)$ $A = 36.35$	**1** **1**	
	(c)		Luas sektor *SWT* / *Area of sector SWT* $= \frac{1}{2}(10)^2(0.7)$ $63.88 = 36.35 + \frac{1}{2}(10)^2(0.7) -$ luas kawasan berlorek / *area of shaded region* Luas kawasan berlorek / *Area of shaded region* $= 7.47$	**1** **1** **1**	**8**
6	(a)		$\frac{-\sin\theta(1-\kos\theta)}{1-\kos^2\theta}$ atau / *or* $\frac{-\sin\theta(1-\cos\theta)}{1-\cos^2\theta}$ $= \frac{\kos\theta-1}{\sin\theta}$ atau / *or* $\frac{\cos\theta-1}{\sin\theta}$ $= \frac{\kos\theta}{\sin\theta} - \frac{1}{\sin\theta}$ atau / *or* $\frac{\cos\theta}{\sin\theta} - \frac{1}{\sin\theta}$ $= \kot\theta - \kosek\theta$ atau / *or* $\cot\theta - \operatorname{cosec}\theta$	**1** **1**	
	(b)	(i)	$y = \lvert 3\tan x \rvert + 1$  -Graf tangen dengan adanya asimptot / *Tangent graph with asymptote* -Satu kitaran dalam julat $0 \le x \le \pi$ / *One cycle in the range* $0 \le x \le \pi$ -Mutlak / *Modulus* -Nilai minimum =1 /*Minimum value* = 1	**1** **1** **1** **1**	
		(ii)	$t \ge 1$	**1**	**7**

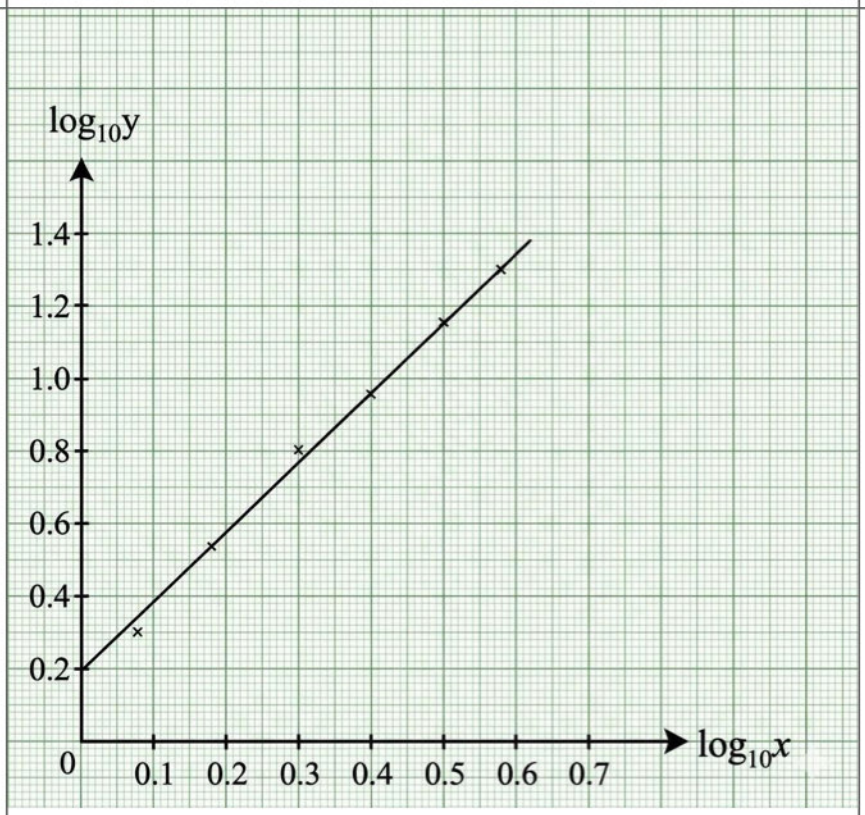
7	(a)		$\frac{dy}{dx} = 3x^2 - 2nx - 4$ $3(1)^2 - 2n(1) - 4 = 3$ $n = -2$	**1** **1**	
	(b)		$x = 1, y = (1)^3 - (-2)(1)^2 - 4(1) + 3$ atau / *or* $3m_2 = -1$ $y = 2$ $m_2 = -\frac{1}{3}$ Ganti (1, 2) dalam $y = mx + c$ atau $y - y_1 = m(x - x_1)$ *Substitute* (1, 2) *into* $y = mx + c$ *or* $y - y_1 = m(x - x_1)$ $2 = -\frac{1}{3}(1) + c$ $y - (2) = -\frac{1}{3}(x - 1)$ $\frac{7}{3} = c$ $3y - 6 = -x + 1$ $y = -\frac{1}{3}x + \frac{7}{3}$ atau / *or* $3y + x = 7$	**1** **1** **1**	
	(c)		$\frac{dy}{dx} = 0,\ 3x^2 + 2(2)x - 4 = 0$ $3x^2 + 4x - 4 = 0$ $(3x - 2)(x + 2) = 0$ $x = \frac{2}{3}$, $x = -2$	**1** **1**	**7**
8	(a)	(i)	$M = \left(\frac{0+10}{2}, \frac{8+0}{2}\right) = (5, 4)$	**1**	
		(ii)	$\frac{1}{2}\|[(10 \times 4) + (5 \times 0) + (0 \times (-4)) + (0 \times 0)] - [(5 \times 0) + (0 \times 4) + (0 \times 0) + (10 \times (-4))]\|$ 40	**1** **1**	
	(b)		$\frac{2(x)+1(5)}{1+2} = 0$ atau / *or* $\frac{2(y)+1(4)}{1+2} = -4$ $\left(-\frac{5}{2}, -8\right)$	**1** **1**	
	(c)	(i)	$\sqrt{(x-0)^2 + (y-8)^2} = 2\sqrt{\left(x - \left(-\frac{5}{2}\right)\right)^2 + (y - (-8))^2}$ $3x^2 + 3y^2 + 20x + 80y + 217 = 0$	**1 + 1** **1**	
		(ii)	$y = 0$ $3x^2 + 20x + 217 = 0$ Pembezalayan / *Discriminant*: $(20)^2 - 4(3)(217) < 0$ Tidak, laluan penghantar tersebut tidak melintasi jalan utama (paksi-x). *No, the rider's path does not cross the main road* (*x-axis*).	**1** **1**	**10**

9	(a)				

$\log_{10} x$	0.08	0.18	0.30	0.40	0.50	0.58
$\log_{10} y$	0.30	0.54	0.80	0.96	1.16	1.30

1

1

	(b)				

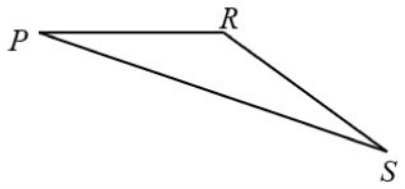
Skala betul dan memplot satu titik dengan betul
Correct scale and plot 1 point correctly **1**

Semua titik diplot dengan betul
Plot all the points correctly **1**

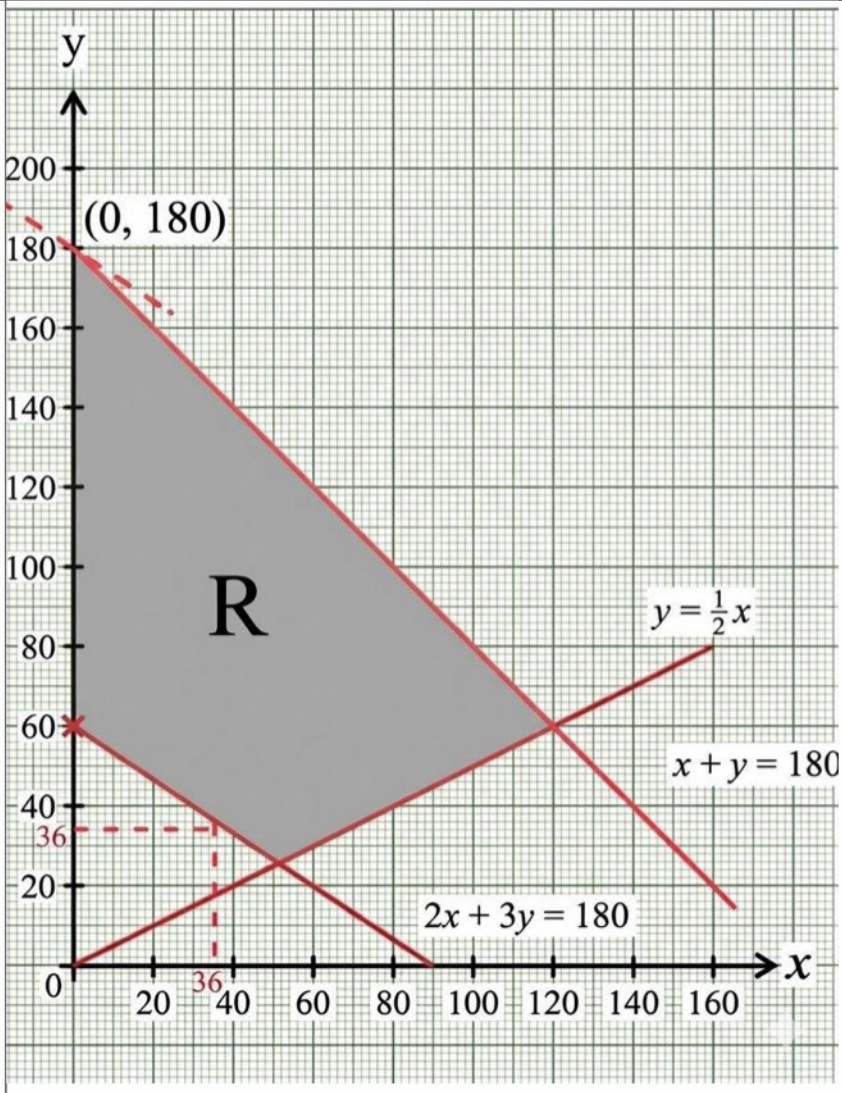
Garis penyuaian terbaik
Line of best fit **1**

	(c)	(i)	$\log_{10} y = n \log_{10} x + \log_{10} k$	**1**	
			$n = \frac{0.96-0.54}{0.40-0.18}$	**1**	
			$n = 1.909$	**1**	
		(ii)	$\log_{10} k = 0.2$	**1**	
			$k = 1.585$	**1**	**10**
10	(a)		$y = x^2 + 4$ $\frac{dy}{dx} = 2x$ $2x = p$	**1**	
			$x = \frac{p}{2}$ $px = x^2 + 4$ $p\left(\frac{p}{2}\right) = \left(\frac{p}{2}\right)^2 + 4$	**1**	
			$\frac{p^2}{2} = \frac{p^2}{4} + 4$		

			$\frac{p^2}{4}=4$ $p^2=16$ $p=\pm4$ $p>0$, maka / *so* $p=4$	**1**	
	(b)		$x=\frac{4}{2}=2$ $y=4(2)=8$ $A(2,8)$ $A_1=\int_0^2(x^2+4)\,dx$ $=\left[\frac{x^3}{3}+4x\right]_0^2$ $=\left[\frac{(2)^3}{3}+4(2)\right]-\left[\frac{(0)^3}{3}+4(0)\right]$ $=10\frac{2}{3}$ $A_2=\frac{1}{2}(2)(8)$ $=8$ A_1-A_2 @ A_2-A_1 $=10\frac{2}{3}-8$ $=2\frac{2}{3}$ Kaedah alternatif / *Alternative method* $A_1=\int_4^8(y-4)^{\frac{1}{2}}\,dy$ $=\left[\frac{(y-4)^{\frac{3}{2}}}{\frac{3}{2}(1)}\right]_4^8$ $=\left[\frac{(8-4)^{\frac{3}{2}}}{\frac{3}{2}(1)}\right]-\left[\frac{(4-4)^{\frac{3}{2}}}{\frac{3}{2}(1)}\right]$ $=5\frac{1}{3}$ A_2-A_1 $=8-5\frac{1}{3}$ $=2\frac{2}{3}$	**1** **1** **1** **1**	
	(c)		$\frac{1}{2}\pi\int_4^q(y-4)\,dy=\frac{9}{4}\pi$ $\frac{1}{2}\pi\left[\frac{y^2}{2}-4y\right]_4^q=\frac{9}{4}\pi$ $\frac{1}{2}\pi\left[\left(\frac{(q)^2}{2}-4(q)\right)-\left(\frac{(4)^2}{2}-4(4)\right)\right]=\frac{9}{4}\pi$ $\frac{q^2}{2}-4q+8=\frac{9}{2}$ $\frac{q^2}{2}-4q+\frac{7}{2}=0$ $q^2-8q+7=0$ $(q-1)(q-7)=0$ $q=1$ atau $q=7$ $q>4,\ q=7$	**1** **1** **1**	**10**
11	(a)	(i)	$P(X\geq0.95)$ $=P(Z\geq\frac{0.95-0.75}{0.15})$ $=P(Z\geq1.333)$ $=0.0913$	**1** **1**	

		(ii)	$P(X < m) = 0.28$ $P(Z < \frac{m-0.75}{0.15}) = 0.28$ $Z = -0.583$ $\frac{m-0.75}{0.15} = -0.583$ $m = 0.66255$ //0.6626	**1** **1** **1**	
	(b)	(i)	${}^nC_1(0.25)^1(0.75)^{n-1}$ @ ${}^nC_0(0.25)^0(0.75)^{n-0}$ @ ${}^nC_n(0.75)^n(0.25)^0$ ${}^nC_1(0.25)^1(0.75)^{n-1} = 4\times{}^nC_0(0.25)^0(0.75)^{n-0}$ atau setara / *or equivalent* $n(0.25)(0.75)^{n-1} = 4(0.75)^n$ $\frac{n(0.25)}{0.75} = 4$ $n = 12$	**1** **1** **1**	
		(ii)	$\sigma = \sqrt{12(0.75)(0.25)}$ $= 1.5$	**1** **1**	**10**
12	(a)	(i)	$29.1 = \frac{1}{2}(15)(RS)\sin 104^\circ$ $RS = 3.999$	**1** **1**	
		(ii)	$\text{kos/cos}\, 64.04^\circ = \frac{8}{PR}$ $PR = 18.28$ $PS^2 = 18.28^2 + 3.999^2 - 2(18.28)(3.999)\,\text{kos/cos}\, 35^\circ$ $PS = 15.18$	**1** **1** **1**	
		(iii)	$\frac{\sin \angle RPS}{3.999} = \frac{\sin 35^\circ}{15.18}$ $\angle RPS = 8.691^\circ$	**1** **1**	
	(b)	(i)		**1**	
		(ii)	$\angle R'SP = 180^\circ - 8.691^\circ - 145^\circ = 26.31^\circ$ $\frac{PR'}{\sin 26.31^\circ} = \frac{15.18}{\sin 145^\circ}$ $PR' = 11.73$	**1** **1**	**10**
13	(a)	(i)	$137 = \frac{18.50}{P_{2023}} \times 100$ $P_{2023} = \text{RM}13.50$	**1** **1**	
		(ii)	Katakan harga bahan *T* pada tahun 2023 ialah *x* *Let the price of material T in the year* 2023 *be x* $125 = \frac{x+9}{x}$ x 100 $x = \text{RM } 36$ $P_{2025} = \text{RM}45$	**1** **1**	

	(b)		$\frac{137(1)+90(1)+(m-2)(1)+2m(1)+125(1)}{1+1+1+1+1} = 127$ $m = 95$	**1** **1**	
	(c)		Kaedah alternatif / *Alternative method* $I_{2026/2025} = \frac{100 \times 134}{127}$ $\quad$ $134 = \frac{125}{P_{2023}} \times 100$ $= 105.51$ $\quad$ $P_{2023} = \text{RM } 98.43$ $105.51 = \frac{P_{2026}}{125} \times 100$ $\quad$ $134 = \frac{P_{2026}}{98.34} \times 100$ $P_{2026} = \text{RM } 131.89$ $\quad$ $P_{2026} = \text{RM } 131.90$	**1** **1** **1** **1**	**10**
14	(a)		$v_P = 4 + 3t - t^2$ $a = \frac{dv}{dt} = 3 - 2t$ halaju maksimum / *maximum velocity*, $\frac{dv}{dt} = 0$ $3 - 2t = 0$ $t = \frac{3}{2}$ $v_P = 4 + 3\left(\frac{3}{2}\right) - \left(\frac{3}{2}\right)^2$ $= 6.25 \text{ ms}^{-1}$	**1** **1** **1**	
	(b)		$v = 0$, $4 + 3t - t^2 = 0$ atau / *or* $t^2 - 3t - 4 = 0$ $(4 - t)(1 + t) = 0$ $\quad$ $(t - 4)(t + 1) = 0$ $t = 4$, $\quad$ $t = -1$ (ditolak / *rejected*) $t = 4$ $s = \int [4 + 3t - t^2] dt$ $= 4t + \frac{3t^2}{2} - \frac{t^3}{3} + c$ Apabila / *When* $t = 0$, $s = 0$, $c = 0$ $s = 4t + \frac{3t^2}{2} - \frac{t^3}{3}$ $s = 4(4) + \frac{3(4)^2}{2} - \frac{(4)^3}{3}$ $= 18.67 \text{ m}$	**1** **1** **1** **1** **1**	
	(c)		$s_Q = 4(-2) = -8$ Kedudukan Q / *Position of* $Q = 28 - 8$ $= 20$ Jarak / *Distance* $= 20 - 18.67$ $= 1.33$	**1** **1** **1**	**10**

15	(a)		$x + y \leq 180$ $y \geq \frac{1}{2}x$ $6x + 9y \geq 540$	**1** **1** **1**	
	(b)		 • Lukis dengan betul sekurang-kurangnya satu garis lurus dari ketaksamaan yang melibatkan x dan y. *Draw at least one straight line correctly from the inequality involving x and y.* • Lukis semua garis lurus dengan betul dari semua ketaksamaan yang melibatkan x dan y. *Draw all the straight lines correctly from all the inequalities involving x and y.* • Rantau dilorek dengan betul. *The region is shaded correctly.*	**1** **1** **1**	
	(c)	(i)	36	**1**	
		(ii)	$P = 6x + 9y$ $(0, 180)$ $P = 6(0) + 9(180)$ $= 1620$	**1** **1** **1**	**10**