

Answers for Analisis Bertopik 2025 will be updated soon!

Please check back later for the updated answers.

JAWAPAN

MATEMATIK TAMBAHAN

Dwibahasa

Bab 1

FUNGSI

KERTAS 1

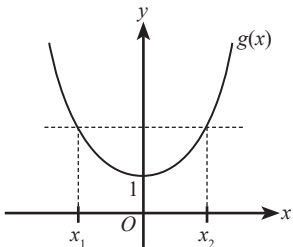
Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	(a) $x = 6$	1	3
	(b) $\frac{3p}{6-2} = 9$	1	
	$3p = 36$ $p = 12$	1	
2	(a) $\{-5, 10, 15, 25\}$	1	3
	(b) $g(x) = 3 - x$ $g(4) = p - 10$ $3 - 4 = p - 10$ $-1 = p - 10$ $-1 + 10 = p$ $p = 9$	1	
		1	
3	(a) $f(7) = h$ $ 7 - 3 + 1 = h$ $ 4 + 1 = h$ $h = 5$ $f(x) = 5$ $ x - 3 + 1 = 5$ $ x - 3 = 4$ $x - 3 = 4$, $x - 3 = -4$ $x = 7$, $x = -1$ $\therefore$ Objek bagi h ialah -1 . <i>Object of h is -1.</i>	1	
		1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
(b)	(i) $f(x) = 4x - 1$ Katakan / Let $4x - 1 = y$ $4x = y + 1$ $x = \frac{y + 1}{4}$ $f^{-1}(x) = \frac{x + 1}{4}$ $f^{-1}(p) = 2$ $\frac{p + 1}{4} = 2$ $p + 1 = 8$ $p = 7$ (ii) $fg(x) = 5f(2)$ $f(2x + 3) = 5[4(2) - 1]$ $4(2x + 3) - 1 = 5(8 - 1)$ $8x + 12 - 1 = 5(7)$ $8x + 11 = 35$ $8x = 24$ $x = 3$	1 1 1 1	6

Bahagian B

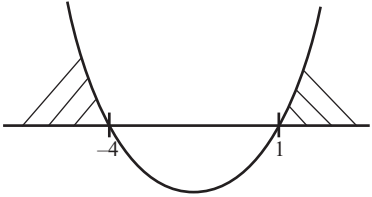
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
4	(a) $\frac{3}{4x-1} = \frac{1}{3}$	1	
	$x = \frac{5}{2}$	1	
	(b) $f(m+1) = 3fg(p)$	1	
	$\frac{3}{4(m+1)-1} = 3\left(\frac{3}{4p^2+3}\right)$		
	$3(4m+4-1) = 4p^2+3$		
	$12m+9 = 4p^2+3$	1	
$m = \frac{4p^2-6}{12}$			
$m = \frac{2p^2-3}{6}$			
(c) (i) $\frac{3}{4g(x)-1} = \frac{3}{4x^2+3}$	1		
	$4g(x)-1 = 4x^2+3$		
	$g(x) = x^2+1$	1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(ii) Ujian garis mengufuk <i>Horizontal line test</i> 	1	8
	Bukan hubungan satu kepada satu <i>Not one to one relationship</i>	1	
5	(a) $2x - 5 \neq 0$ $2x \neq 5$ $x \neq \frac{5}{2}$ $\therefore h = \frac{5}{2}$	1	
	(b) $f(x) = x$ $2x - 5 = x$ $2x - x = 5$ $x = 5$	1	
		1	
	(c) (i) $gf(x) = \frac{4}{2x-5}$ $g(2x-5) = \frac{4}{2x-5}$ Katakan / Let $2x - 5 = m$ $2x = m + 5$ $x = \frac{m+5}{2}$ $g(m) = \frac{4}{2\left(\frac{m+5}{2}\right) - 5}$ $= \frac{4}{m+5-5}$ $= \frac{4}{m}$ $\therefore g(x) = \frac{4}{x}, x \neq 0$	1	
	(ii) $g^2(x) = g\left(\frac{4}{x}\right)$ $= \frac{4}{\frac{4}{x}}$ $= x$	1	
	$g^3(x) = gg^2(x)$ $= g(x)$ $g^3(x) = \frac{4}{x}$	1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	$(a) \quad gf(x) = 3x - 4, \quad f(x) = x + 2$ $g(x + 2) = 3x - 4$ $f^{-1}(x) = y$ $f(y) = x$ $y + 2 = x$ $y = x - 2$ $f^{-1}(x) = x - 2$ $g(x) = gf[f^{-1}(x)]$ $= 3(x - 2) - 4$ $= 3x - 10$	1	7
		1	
		1	
	$(b) \quad (i) \quad f^2(x) = ff(x)$ $= (x + 2) + 2$ $= x + 4$ $(ii) \quad f^3(x) = ff^2(x)$ $= (x + 4) + 2$ $= x + 6$ $f^n(x) = x + 2n$	1	
		1	
2	$(a) \quad g^{-1}(x) = \pm\sqrt{x + 3}$ Tidak. Fungsi g tidak mempunyai songsangan. <i>No. Function g does not have inverse.</i>	1	7
		1	
	$(b) \quad (i) \quad h(x) = fg(x)$ $= 1 - 2(x^2 - 3)$ $= 7 - 2x^2$	2	
	$(ii) \quad f^{-1}(x) = \frac{1 - x}{2}$ $\left(\frac{1 - x}{2}\right)^2 - 3 = 1$ $(1 - x)^2 = 16$ $1 - x = \pm 4$ $x = -3, 5$	1	
		1	

KERTAS 1

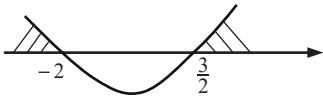
Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	(a) $f(x) > 0$ $x^2 + 3x - 4 > 0$ $(x + 4)(x - 1) > 0$  $x < -4, x > 1$	1	
	(b) (i) $px + q - (x^2 + 3x - 4) = 0$ $-x^2 + (p - 3)x + q + 4 = 0$ $x^2 - (p - 3)x - q - 4 = 0$ $\alpha + \beta = p - 3$ $\alpha\beta = -q - 4$ (ii) $x^2 + rx + r - 10 = 0$ $\frac{2}{\alpha} + \frac{2}{\beta} = -r$ dan / and $\left(\frac{2}{\alpha}\right)\left(\frac{2}{\beta}\right) = r - 10$ $\frac{2}{\alpha} + \frac{2}{\beta} = -r$ $2\left(\frac{\beta + \alpha}{\alpha\beta}\right) = -r$ $\frac{2(p - 3)}{-q - 4} = -r$ $r = \frac{2(p - 3)}{q + 4}$ $\left(\frac{2}{\alpha}\right)\left(\frac{2}{\beta}\right) = r - 10$ $\frac{4}{\alpha\beta} = r - 10$ $\frac{4}{-q - 4} = r - 10$ $r = \frac{-4}{q + 4} + 10$ $\frac{2(p - 3)}{q + 4} = \frac{-4}{q + 4} + 10$ $2(p - 3) = -4 + 10(q + 4)$ $2(p - 3) = 10q + 36$ $p - 3 = 5q + 18$ $p = 5q + 21$	1 1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks																
2	(a) $y = -x + c \dots \textcircled{1}$ $y = -2x^2 + 3x + p \dots \textcircled{2}$ $\textcircled{1} = \textcircled{2}$: $-2x^2 + 3x + p = -x + c$ $-2x^2 + 3x + p + x - c = 0$ $-2x^2 + 4x + p - c = 0$ Tangen kepada lengkung / <i>Tangent to the curve</i>, $b^2 - 4ac = 0$ $(4)^2 - 4(-2)(p - c) = 0$ $16 + 8(p - c) = 0$ $16 + 8p - 8c = 0$ $8p = 8c - 16$ $p = c - 2$	1 1 1																	
	(b) $(x + 1)(-3x - 3) < x - 1$ $-3x^2 - 3x - 3x - 3 - x + 1 < 0$ $-3x^2 - 7x - 2 < 0$ $3x^2 + 7x + 2 > 0$ $(3x + 1)(x + 2) > 0$ Apabila $(3x + 1)(x + 2) = 0$, $x = -\frac{1}{3}$ atau -2. When $(3x + 1)(x + 2) = 0$, $x = -\frac{1}{3}$ or -2. <table><tr><td></td><td>$x < -2$</td><td>$-2 < x < -\frac{1}{3}$</td><td>$x > -\frac{1}{3}$</td></tr><tr><td>$(3x + 1)$</td><td>-</td><td>-</td><td>+</td></tr><tr><td>$(x + 2)$</td><td>-</td><td>+</td><td>+</td></tr><tr><td>$(3x + 1)(x + 2)$</td><td>+</td><td>-</td><td>+</td></tr></table> Daripada jadual, $(3x + 1)(x + 2) > 0$ apabila $x < -2$ atau $x > -\frac{1}{3}$. From the table, $(3x + 1)(x + 2) > 0$ when $x < -2$ or $x > -\frac{1}{3}$. $\therefore x < -2$ atau / or $x > -\frac{1}{3}$			$x < -2$	$-2 < x < -\frac{1}{3}$	$x > -\frac{1}{3}$	$(3x + 1)$	-	-	+	$(x + 2)$	-	+	+	$(3x + 1)(x + 2)$	+	-	+	1 1
		$x < -2$		$-2 < x < -\frac{1}{3}$	$x > -\frac{1}{3}$														
$(3x + 1)$	-	-	+																
$(x + 2)$	-	+	+																
$(3x + 1)(x + 2)$	+	-	+																
(c) $2x^2 + 6x + 4p^2 = 0$ Punca / Roots = $p, 2p$ HTP / SOR: $p + 2p = -\frac{6}{2}$ $3p = -3$ $p = -1$ $\therefore 2x^2 + 6x + 4(-1)^2 = 0$ $2x^2 + 6x + 4 = 0$ Punca baru / New roots: $p - 1 = -1 - 1$, $p + 1 = -1 + 1$ $= -2$ $= 0$ HTP / SOR: $-2 + 0 = -2$ HDP / POR: $(-2)(0) = 0$ $x^2 - (\text{HTP} / \text{SOR})x + (\text{HDP} / \text{POR}) = 0$ $x^2 - (-2)x + 0 = 0$ $x^2 + 4x = 0$	1 1 1																		

8

Bahagian B

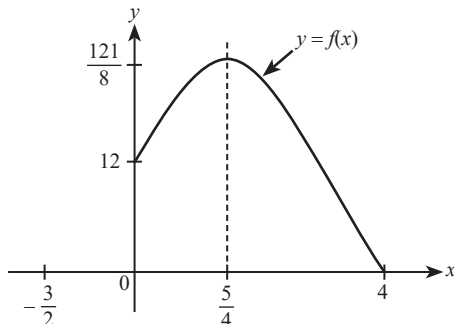
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks																	
3	(a) $-\frac{1}{4} + \left[-\frac{1}{4} - (-2)\right] = \frac{3}{2}$  $x < -2, x > \frac{3}{2}$	1	8																	
	(b) $b^2 - 4ac > 0$ $h^2 - 4(2)(-2k + 5) > 0$ $h^2 + 16k - 40 > 0$ $k > \frac{40 - h^2}{16}$	1 1																		
	(c) $f(x) = 2\left[x^2 + \frac{h}{2}x\right] - 2k + 5$ $= 2\left[x^2 + \frac{h}{2}x + \left(\frac{h}{2}\right)^2 - \left(\frac{h}{2}\right)^2\right] - 2k + 5$ $= 2\left(x + \frac{h}{4}\right)^2 - 2\left(\frac{h}{4}\right)^2 - 2k + 5$ $= 2\left(x + \frac{h}{4}\right)^2 - \frac{h^2}{8} - 2k + 5$ $-\frac{h}{4} = -\frac{1}{4}$ $h = 1$ Nilai minimum / Minimum value $= -\frac{1^2}{8} - 2k + 5$ $= \frac{39}{8} - 2k$	 1 1 1 1																		
	(a) $(x)(x) + (2x + 10)(x) > 8$ $x^2 + 2x^2 + 10x - 8 > 0$ $3x^2 + 10x - 8 > 0$ $(3x - 2)(x + 4) > 0$ <table border="1" data-bbox="231 1289 943 1481"><tr><td></td><td>$x < -4$</td><td>$-4 < x < \frac{2}{3}$</td><td>$x > \frac{2}{3}$</td></tr><tr><td>$3x - 2$</td><td>–</td><td>–</td><td>+</td></tr><tr><td>$x + 4$</td><td>–</td><td>+</td><td>+</td></tr><tr><td>$(3x - 2)(x + 4)$</td><td>⊕</td><td>–</td><td>⊕</td></tr></table> $x > \frac{2}{3}, x < -4$			$x < -4$	$-4 < x < \frac{2}{3}$	$x > \frac{2}{3}$	$3x - 2$	–	–	+	$x + 4$	–	+	+	$(3x - 2)(x + 4)$	⊕	–	⊕	 1 1	
		$x < -4$		$-4 < x < \frac{2}{3}$	$x > \frac{2}{3}$															
$3x - 2$	–	–	+																	
$x + 4$	–	+	+																	
$(3x - 2)(x + 4)$	⊕	–	⊕																	
(b) (i) $x^2 + 3x = -4p$ $x^2 + 3x + 4p = 0$ $b^2 - 4ac < 0$ $(3)^2 - 4(1)(4p) < 0$ $9 - 16p < 0$ $-16p < -9$ $p > \frac{9}{16}$	 1 1																			

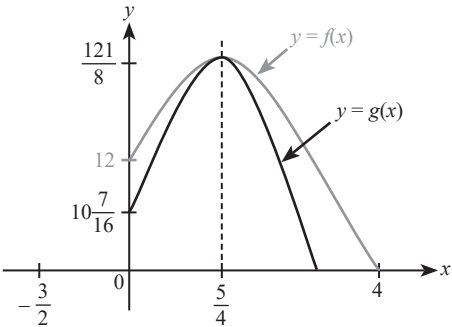
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(ii) $x^2 + 3x + 4p = 0$ Punca / Roots: α, β HTP / SOR: $\alpha + \beta = -\frac{3}{1}$ $= -3$ HDP / POR: $\alpha\beta = \frac{4p}{1}$ $= 4p$ Punca baru / New roots = $\alpha - \beta + 1, \beta - \alpha + 1$ HTP baru / New SOR: $(\alpha - \beta + 1) + (\beta - \alpha + 1) = \alpha - \beta + 1 + \beta - \alpha + 1$ $= 2$ HDP baru / New POR: $(\alpha - \beta + 1)(\beta - \alpha + 1) = \alpha\beta - \alpha^2 + \alpha - \beta^2 + \alpha\beta - \beta + \beta - \alpha + 1$ $= -\alpha^2 - \beta^2 + 2\alpha\beta + 1$ $= -(\alpha^2 + \beta^2) + 2\alpha\beta + 1$ $= -[(\alpha + \beta)^2 - 2\alpha\beta] + 2\alpha\beta + 1$ $= -(\alpha + \beta)^2 + 4\alpha\beta + 1$ $= -(-3)^2 + 4(4p) + 1$ $= -9 + 16p + 1$ $= -8 + 16p$ Persamaan baru / New equation: $x^2 - 2x + (-8 + 16p) = 0$ $x^2 - 2x + 16p - 8 = 0$	1 1 1 1	8

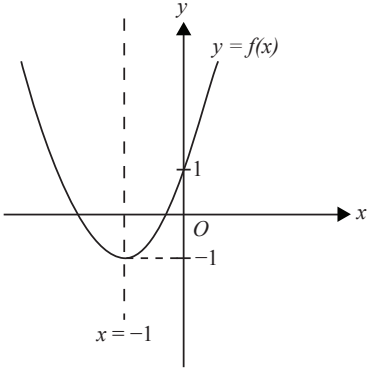
KERTAS 2

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	(a) $\frac{5}{2} = \alpha + \beta$ $\frac{p}{2} = \alpha\beta$ $2\alpha - 1 + 2\beta - 1 = 2(\alpha + \beta) - 2$ $= 2\left(\frac{5}{2}\right) - 2$ $= 3$ $(2\alpha - 1)(2\beta - 1) = 4\alpha\beta - 2(\alpha + \beta) + 1$ $= 4\left(\frac{p}{2}\right) - 2\left(\frac{5}{2}\right) + 1$ $= 2p - 4$ $x^2 - (3)x + (2p - 4) = 0$ $x^2 - 3x + 2p - 4 = 0$	1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(b) $2x^2 - 5x + p = x + 1$ $2x^2 - 6x + p - 1 = 0$ $b^2 - 4ac = 0$ $(-6)^2 - 4(2)(p - 1) = 0$ $36 - 8p + 8 = 0$ $p = \frac{44}{8}$ $p = \frac{11}{2}$	1 1 1	6
2	(a) $2x + 3 = 0$ $2x = -3$ $x = -\frac{3}{2}$ $f(x) = x(5 - 2x) + m$ $f(x) = 5x - 2x^2 + m$ $f(x) = -2x^2 + 5x + m$ Apabila / When $x = -\frac{3}{2}, f(x) = 0$ $-2\left(-\frac{3}{2}\right)^2 + 5\left(-\frac{3}{2}\right) + m = 0$ $-12 + m = 0$ $m = 12$	1 1 1	
	(b) $f(x) = -2x^2 + 5x + 12$ $= -2\left(x^2 - \frac{5}{2}x - 6\right)$ $= -2\left[x^2 - \frac{5}{2}x + \left(-\frac{5}{2}\right)^2 - \left(-\frac{5}{2}\right)^2 - 6\right]$ $= -2\left[x^2 - \frac{5}{2}x + \left(-\frac{5}{4}\right)^2 - \left(-\frac{5}{4}\right)^2 - 6\right]$ $= -2\left[\left(x - \frac{5}{4}\right)^2 - \frac{25}{16} - 6\right]$ $= -2\left[\left(x - \frac{5}{4}\right)^2 - \frac{121}{16}\right]$ $= -2\left(x - \frac{5}{4}\right)^2 + \frac{121}{8}$ $\therefore a = -2, h = \frac{5}{4}, k = \frac{121}{8}$ 	1 1 2	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(c) $g(x) = (a - 1)(x - h)^2 + k$ $= (-2 - 1)\left(x - \frac{5}{4}\right)^2 + \frac{121}{8}$ $= -3\left(x - \frac{5}{4}\right)^2 + \frac{121}{8}$ 	1	8
3	(a) $f(x) = 3x^2 + 3px + p$ $f(x) = 3\left(x^2 + px + \frac{p}{3}\right)$ $f(x) = 3\left[x^2 + px + \left(\frac{p}{2}\right)^2 - \left(\frac{p}{2}\right)^2 + \frac{p}{3}\right]$ $f(x) = 3\left[\left(x + \frac{p}{2}\right)^2 - \frac{p^2}{4} + \frac{p}{3}\right]$ $f(x) = 3\left(x + \frac{p}{2}\right)^2 - \frac{3p^2}{4} + p$ Nilai minimum / Minimum value = -1 $-\frac{3p^2}{4} + p = -1$ $-3p^2 + 4p = -4$ $-3p^2 + 4p + 4 = 0$ $3p^2 - 4p - 4 = 0$ $(3p + 2)(p - 2) = 0$ $3p + 2 = 0, p - 2 = 0$ $p = -\frac{2}{3}, p = 2$ (b) $p = 2; f(x) = 3\left(x + \frac{2}{2}\right)^2 - \frac{3(2)^2}{4} + 2$ $f(x) = 3(x + 1)^2 - 1$ Apabila / When $f(x) = 0$; $3(x + 1)^2 - 1 = 0$ $(x + 1)^2 = \frac{1}{3}$ $x + 1 = \pm\sqrt{\frac{1}{3}}$ $x = -1 \pm\sqrt{\frac{1}{3}}$	1 1 2 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	Apabila / When $x = 0$; $f(x) = 3(0 + 1)^2 - 1$ $f(x) = 2$ Apabila / When, $x + 1 = 0$ $x = -1$ 	1	6
4	(a) $f(x) = (x - 3)^2 + k$ $f(0) = 5$ $(0 - 3)^2 + k = 5$ $9 + k = 5$ $k = -4$	1	
	(b) (i) $f(x) = (x - 3)^2 - 4$ $= x^2 - 6x + 9 - 4$ $= x^2 - 6x + 5$ $f(x) = 0$ $x^2 - 6x + 5 = 0$ $(x - 1)(x - 5) = 0$ $x = 1, 5$ Punca-punca bagi graf fungsi $f(x)$ dan $g(x)$ ialah 1 dan 5. The roots of graph $f(x)$ and graph $g(x)$ are 1 and 5.	1	
	$g(1) = 0$ $-3(1)^2 + (m - 4)(1) - 15 = 0$ $-3 + m - 4 - 15 = 0$ $m - 22 = 0$ $m = 22$	1	
	(ii) $g(x) = -3x^2 + 18x - 15$ $= -3(x^2 - 6x + 5)$ $= -3\left[x^2 - 6x + \left(\frac{-6}{2}\right)^2 - \left(\frac{-6}{2}\right)^2 + 5\right]$ $= -3(x - 3)^2 + 12$ Titik maksimum / Maximum point = (3, 12)	1	
		1	

KERTAS 1

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	$(2x + 3y - 2z = -6) \times 6$ $12x + 18y - 12z = -36 \dots \textcircled{1}$		
	$(-3x + y + 4z = -7) \times 3$ $-9x + 3y + 12z = -21 \dots \textcircled{2}$		
	$(-4x - 5y - 6z = 4) \times 2$ $-8x - 10y - 12z = 8 \dots \textcircled{3}$		
	$\textcircled{1} + \textcircled{2}$: $(12x + 18y - 12z) + (-9x + 3y + 12z) = -36 + (-21)$ $3x + 21y = -57$ $x + 7y = -19$ $x = -19 - 7y \dots \textcircled{4}$	1	
	$\textcircled{1} + \textcircled{3}$: $(12x + 18y - 12z) - (-8x - 10y - 12z) = -36 - 8$ $20x + 28y = -44$ $5x + 7y = -11$ $5(-19 - 7y) + 7y = -11$ $-28y = -11 + 95$ $-28y = 84$ $y = \frac{84}{-28}$ $y = -3$	1	
	Dari / From $\textcircled{4}$, $x = -19 - 7(-3)$ $x = -19 + 21$ $x = 2$	1	
	Dari / From $\textcircled{1}$, $12(2) + 18(-3) - 12z = -36$ $24 - 54 - 12z = -36$ $-12z = -36 - 24 + 54$ $-12z = -6$ $z = \frac{-6}{-12}$ $z = \frac{1}{2}$	1	
	$\therefore x = 2, y = -3, z = \frac{1}{2}$		
			5

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	$4x + y + 2z = 0 \dots\dots\dots ①$ $-2x + 3y + z = 8 \dots\dots\dots ②$ $x - y - z = -\frac{1}{2} \dots\dots\dots ③$ Dari / Form ① : $y = -4x - 2z \dots\dots\dots ④$ Ganti ④ ke dalam ② <i>Substitute ④ into ②</i> $-2x + 3(-4x - 2z) + z = 8$ $-2x - 12x - 6z + z = 8$ $-14x - 5z = 8$ $x = \frac{-5z - 8}{14} \dots\dots\dots ⑤$ Ganti ④ dan ⑤ ke dalam ③ / <i>Substitute ④ and ⑤ into ③</i> $\left(\frac{-5z - 8}{14}\right) - \left[-4\left(\frac{-5z - 8}{14}\right) - 2z\right] - z = -\frac{1}{2}$ $-5z - 8 - 20z - 32 + 28z - 14z = -7$ $-11z = 33$ $z = -3$ $x = \frac{-5(-3) - 8}{14} = \frac{1}{2}$ $y = -4\left(\frac{1}{2}\right) - 2(-3) = 4$ $x = \frac{1}{2}; y = 4; z = -3$	1 1 1 1 1	5
2	(a) $2p - q - r = 6$ $2p - r - 6 = q \dots ①$ $p + 2q - 4r = 8 \dots ②$ $3p + q - r = 2 \dots ③$ Ganti ① ke dalam ② / <i>Substitute ① into ②</i> $① \rightarrow ②; p + 2(2p - r - 6) - 4r = 8$ $p + 4p - 2r - 12 - 4r = 8$ $5p - 6r - 20 = 0 \dots ④$ Ganti ① ke dalam ③ / <i>Substitute ① into ③</i> $① \rightarrow ③; 3p + (2p - r - 6) - r = 2$ $3p + 2p - r - 6 - r = 2$ $5p - 2r - 8 = 0 \dots ⑤$ $⑤ - ④; 5p - 2r - 8 - (5p - 6r - 20) = 0$ $5p - 2r - 8 - 5p + 6r + 20 = 0$ $4r + 12 = 0$ $4r = -12$ $r = -3$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	Dari / From ⑤, $5p - 2(-3) - 8 = 0$ $5p + 6 - 8 = 0$ $5p - 2 = 0$ $5p = 2$ $p = \frac{2}{5}$ Dari / From ①, $q = 2\left(\frac{2}{5}\right) - (-3) - 6$ $q = \frac{4}{5} + 3 - 6$ $q = -\frac{11}{5}$ $\therefore p = \frac{2}{5}, q = -\frac{11}{5}, r = -3$	1 1 1	5

Bab 4

INDEKS, SURD DAN LOGARITMA

KERTAS 1

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $x^{2k+p} = x^0$ $2k + p = 0$ $p = -2k$ (ii) $a^p = (a^{1/k})^6$ Bandingkan kuasa / Comparing power $p = \frac{1}{k} (6)$ $p = \frac{6}{k}$	1 1	4
	(b) $3^{y-2x-2} = 3^4$ Bandingkan kuasa / Comparing power $y - 2x - 2 = 4$ $y = 2x + 6$	1 1	
2	(a) $2^x = 8^y = \sqrt{2^{3z}}$ $2^x = (2^3)^y = (2^{3z})^{\frac{1}{2}}$ $2^x = 2^{3y} = 2^{\frac{3z}{2}}$ $x = 3y = \frac{3z}{2}$ $x = 3y$ $\frac{x}{y} = \frac{3}{1}$ $x : y = 3 : 1$ $3y = \frac{3z}{2}$ $\frac{y}{z} = \frac{\left(\frac{3}{2}\right)}{3}$	1	

[illegible]

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
4	(a) Jika / If $\log_a mn = p, mn = a^p$ $\log_a m = q, m = a^q$ $\log_a n = r, n = a^r$ Jadi / So, $mn = a^q a^r = a^{q+r}$ Maka / Then, $\log_a mn = q + r = \log_a m + \log_a n$	1	6
		1	
	(b) $\log_u (u+3)(u-1) = 2$ $(u+3)(u-1) = u^2$ $u^2 + 2u - 3 = u^2$ $2u = 3$ $u = \frac{3}{2}$	1	
5	$\log_{\frac{m}{n}} p = \frac{1}{\log_{\frac{m}{n}} p}$ $= \frac{1}{\log_p m - \log_p n}$ $= \frac{1}{\frac{1}{\log_m p} - \frac{1}{\log_n p}}$ $= \frac{1}{\frac{1}{x} - \frac{1}{y}}$ $= \frac{1}{\frac{y-x}{xy}}$ $= \frac{xy}{y-x}$	1	3
		1	
		1	

Bahagian B

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
6	(a) $(2^{x+1})^2 + (\sqrt{2^x})^2 = (3\sqrt{2})^2$ $4(2^{2x}) + 2^x = 18$ $4(2^{2x})^2 + 2^x - 18 = 0$ $[4(2^x) + 9][2^x - 2] = 0$ $4(2^x) + 9 = 0$ $2^x = -\frac{9}{4}$ $2^x > 0$ $2^x = -\frac{9}{4}$ (tidak mungkin / not possible) $2^x - 2 = 0$ $2^x = 2$ $x = 1$	1	
		1	
		1	
		1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	$x = \frac{-\left(\frac{30 + 73\sqrt{2}}{2}\right)}{-\frac{287}{4}}$ $x = \frac{30 + 73\sqrt{2}}{2} \times \frac{4}{287}$ $x = \frac{60 + 146\sqrt{2}}{287}$ $x = \frac{60}{287} + \frac{146}{287}\sqrt{2}$	1	8

KERTAS 2

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) $p^{x-2} \cdot q^{x+2} = (pq)^{2x}$ $\left(\frac{p^x}{p^2}\right)(q^x)(q^2) = (pq)^{2x}$ $(pq)^x \left(\frac{q^2}{p^2}\right) = (pq)^{2x}$ $\left(\frac{q}{p}\right)^2 = \frac{(pq)^{2x}}{(pq)^x}$ $\left(\frac{q}{p}\right)^2 = (pq)^{2x-x}$ $\left(\frac{q}{p}\right)^2 = (pq)^x \text{ (Ditunjukkan / Shown)}$	1 1 1	
	(b) $\frac{k}{4-\sqrt{7}} + \sqrt{28} = \frac{k}{4-\sqrt{7}} + \sqrt{28} \left(\frac{4-\sqrt{7}}{4-\sqrt{7}}\right)$ $= \frac{k + \sqrt{28}(4-\sqrt{7})}{4-\sqrt{7}}$ $= \frac{k + 4\sqrt{28} - \sqrt{196}}{4-\sqrt{7}}$ $= \frac{k + 4(2\sqrt{7}) - 14}{4-\sqrt{7}}$ $= \frac{k - 14 + 8\sqrt{7}}{4-\sqrt{7}} \times \frac{4+\sqrt{7}}{4+\sqrt{7}}$ $= \frac{4k - 56 + 32\sqrt{7} + k\sqrt{7} - 14\sqrt{7} + 56}{16-7}$ $= \frac{4k + (18+k)\sqrt{7}}{9}$ $= \frac{4k}{9} + \left(\frac{18+k}{9}\right)\sqrt{7}$ $p = \frac{4k}{9}, q = \frac{18+k}{9}$	1 1 1	6

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
2	(a) $\sqrt{0.25}$ bukan suatu surd kerana ia merupakan nombor nisbah. <i>$\sqrt{0.25}$ is not a surd because it is a rational number.</i>	1	
	(b) (i) $\log_a b = x$	1	
	$b = a^x$	1	
	$\log_c b = \log_c a^x$		
	$\log_c b = x \log_c a$	1	
	$x = \frac{\log_c b}{\log_c a}$		
	$\log_a b = \frac{\log_c b}{\log_c a}$		
	(ii) $\log_3 h + \log_9 k = \log_3 h + \frac{\log_3 k}{\log_3 9}$	1	
	$= \log_3 h + \frac{\log_3 k}{\log_3 3^2}$	1	
	$= \log_3 h + \frac{\log_3 k}{2}$		
	$= \log_3 h + \frac{1}{2} \log_3 k$		
	$= \log_3 h + \log_3 k^{\frac{1}{2}}$		
	$= \log_3 h k^{\frac{1}{2}}$	1	7

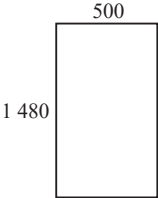
Bab 5

JANJANG

KERTAS 1

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) $(x, x + 20, x + 40)$ mm	1	
	(b) $a = x$ $T_{72} = x + (72 - 1)(20)$ $= x + 1\,420$ $S_{72} = 55\,440$	1	
	$\frac{72}{2} (x + x + 1\,420) = 55\,440$ $2x + 1\,420 = \frac{55\,440}{36}$ $x = 60$	1	
	18 kepingan terakhir / Last 18 terms: $T_{55}, T_{56}, \dots, T_{72}$ $S_{18} = \frac{18}{2} [2(60 + 30(20)) + (18 - 1)(20)]$ $= 14\,940$ mm	1	
		1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(c) Cara 1 / Method 1 $60 + (72 - 1)(20) = 1\,480$  $2\pi r = 1\,480$ $r = \frac{1\,480}{2}$ $= \frac{740}{\pi}$ $60 + (72 - 1)(20) = 1\,480$ dan / and $r = \frac{740}{\pi}$ $V_1 = \pi r^2 h$ $= \pi \left(\frac{740}{\pi} \right)^2 (500)$ $= \frac{273\,800\,000}{\pi} \text{ mm}^3$ $= \frac{2.738 \times 10^8}{\pi} \text{ mm}^3$ Cara 2 / Method 2 $2\pi r = 500$ $r = \frac{500}{2\pi}$ $= \frac{250}{\pi}$  $V_2 = \pi r^2 h$ $= \pi \left(\frac{250}{\pi} \right)^2 (1\,480)$ $= \frac{92\,500\,000}{\pi} \text{ mm}^3$ $= \frac{9.25 \times 10^7}{\pi} \text{ mm}^3$ $V_1 = \pi \left(\frac{740}{\pi} \right)^2 (500)$ dan / and $V_2 = \pi \left(\frac{250}{\pi} \right)^2 (1\,480)$ Cara 1 membentuk silinder dengan isi padu maksimum: Method 1 forms a cylinder with maximum volume: $V_1 = \frac{2.738 \times 10^8}{\pi} \text{ mm}^3 \text{ dan / and } r = \frac{740}{\pi}$	1	
		1	
		1	8
2	(a) $T_1 = a,$ $T_2 = a + d,$ $T_3 = a + d + d$ $= a + 2d$ $T_1 = a + (1 - 1)d$ $T_2 = a + (2 - 1)d$ $T_3 = a + (3 - 1)d$ Jadi / So, $T_n = a + (n - 1)d$	1	
		1	
		1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(b) (i) $\frac{1}{2} \times 12 \times x = 72$ $x = 12$ $T_{31} = a + (31 - 1)d$ $= 12$ Diberi / Given, $a = 30d$ $30d + (31 - 1)d = 12$ $60d = 12$ $d = \frac{1}{5}$ (ii) $a = 30\left(\frac{1}{5}\right)$ $= 6$ Jisim segulung kertas The mass of a roll of paper $= S_{31} \times 12 \times 4 \times 10^{-5} \text{ kg cm}^{-2}$ $= \frac{31}{2} \left[2(6) + (31 - 1)\left(\frac{1}{5}\right) \right] \times 12 \times 4 \times 10^{-5} \text{ kg cm}^{-2}$ $= 0.1339 \text{ kg}$ RM9: $\frac{2.5}{0.1339} \approx 18 \text{ gulungan / rolls}$ RM6: RM1.20 setiap / every 0.5 kg $\rightarrow$ RM2.40 setiap kg / every kg $\frac{6}{2.4} = 2.5 \text{ kg}$ $\frac{2.5}{0.1339} \approx 18 \text{ gulungan / rolls}$ $18 + 18 = 36 \text{ gulungan / rolls}$ $36 \times 0.1339 \text{ kg} = 4.821 \text{ kg}$ $5 - 4.821 \text{ kg} = 0.179 \text{ kg} \rightarrow 1 \text{ gulung lagi / more roll}$ Bilangan gulungan maksimum = $36 + 1$ The number of maximum rolls is $= 37$	1 1 1 2 1	9
3	(a) Janjang aritmetik / Arithmetic progression $a, a + d, (a + d) + d, \dots$ $T_4 = 3T_1$ $a + (4 - 1)(d) = 3a$ $a + 3d = 3a$ $3d = 2a \dots \textcircled{1}$ $S_4 = 72^\circ$ $\frac{4}{2}[2a + (4 - 1)(d)] = 72$ $2(2a + 3d) = 72$ $2(2a + 2a) = 72$ $8a = 72$ $a = 9$ $\therefore$ Bahagian terkecil / Smallest piece = $T_1 = a = 9^\circ$	1 1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(b) Dari / From ①, $3d = 2(9)$ $3d = 18$ $d = 6$ $S_n = 360^\circ$ $\frac{n}{2}[2(9) + (n-1)(6)] = 360^\circ$ $\frac{n}{2}(18 + 6n - 6) = 360^\circ$ $n(6n + 12) = 720^\circ$ $6n^2 + 12n - 720^\circ = 0$ $n^2 + 2n - 120^\circ = 0$ $(n-10)(n+12) = 0$ $n-10=0$, $n+12=0$ $n=10$, $n=-12$ (abaikan / ignore) $\therefore n=10$	1 1 1	7
4	(a) $y-x=45-50$ $y-x=-5$ (b) $\frac{y}{x} = \frac{45}{50}$ $\frac{y}{x} = \frac{9}{10}$	1 1	2
5	(a) (i) 4, 8, 16 $r_1 = \frac{8}{4} = 2$ $r_2 = \frac{16}{8} = 2$ Janjang geometri kerana $r_1 = r_2 = 2$ Geometric progression because $r_1 = r_2 = 2$ (ii) $T_n = ar^{n-1}$ $= (4)(2)^{n-1}$ $= (2^2)(2)^{n-1}$ $= 2^{n-1+2}$ $= 2^{n+1}$ (b) AP: $T_n = a + (n-1)d$, $T_2 = 5p - 10$ $a + (2-1)d = 5p - 10$ $a + d = 5p - 10$ $d = 5p - 10 - a \dots \textcircled{1}$ $T_{10} = 7a$ $a + (10-1)d = 7a$ $a + 9d = 7a$ $a + 9(5p - 10 - a) = 7a$ $a + 45p - 90 - 9a = 7a$ $a - 9a - 7a = 90 - 45p$ $-15a = 90 - 45p$ $a = \frac{90 - 45p}{-15}$ $a = -6 + 3p$	1 1 1 1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(c) $T_1 = a, T_n = 5a$ Jumlah sudut / Total interior angle = $(n - 2) \times 180^\circ$ $S_n = (n - 2) \times 180^\circ$ $\frac{n}{2} (a + l) = (n - 2) \times 180^\circ$ $\frac{n}{2} (a + 5a) = (n - 2) \times 180^\circ$ $\frac{n}{2} (6a) = (n - 2) \times 180^\circ$ $3an = (n - 2) \times 180^\circ$ $a = \frac{(n - 2) \times 180^\circ}{3n}$ $a = \frac{(n - 2) \times 60^\circ}{n}$	1 1	8
6	(a) $S_n < 650$ $217 \left[\frac{1 - \left(\frac{2}{3}\right)^n}{1 - \frac{2}{3}} \right] < 650$ $1 - \left(\frac{2}{3}\right)^n < \frac{650}{651}$ $1 - \frac{650}{651} < \left(\frac{2}{3}\right)^n$ $\frac{1}{651} < \left(\frac{2}{3}\right)^n$ $\left(\frac{2}{3}\right)^n > \frac{1}{651}$ $n < \frac{\lg\left(\frac{1}{651}\right)}{\lg\left(\frac{2}{3}\right)}$ $n < 15.98$ $n = 15$	1 1	
	(b) $S_\infty - T_5 = \frac{217}{1 - \frac{2}{3}} - 217 \left(\frac{2}{3}\right)^4$ $= 651 - \frac{3\,472}{81}$ $= 608 \frac{11}{81}$	2 1	5

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	(a) $S_4 = 16(S_8 - S_4)$ $\frac{a(r^4 - 1)}{r - 1} = 16 \left[\frac{a(r^8 - 1)}{r - 1} - \frac{a(r^4 - 1)}{r - 1} \right]$ $\left[\frac{a(r^4 - 1)}{r - 1} \right] \times \frac{(r - 1)}{a} = 16 \left[\frac{a(r^8 - 1)}{r - 1} - \frac{a(r^4 - 1)}{r - 1} \right] \times \frac{(r - 1)}{a}$ $r^4 - 1 = 16r^8 - 16r^4$ $r^4 - 1 = 16r^8 - 16r^4$ $16r^8 - 17r^4 + 1 = 0$ Katakan / Let $x = r^4$, $16x^2 - 17x + 1 = 0$ $(x - 1)(16x - 1) = 0$ $x = r^4 = 1$ $r = \pm 1$ (Mustahil / Impossible) $x = r^4 = \frac{1}{16}$ $r = \pm \frac{1}{2} \text{ (Abai negatif / Ignore negative)}$ $r = \frac{1}{2}$	1 1 1	7
	(b) (i) $T_8 - T_4 = 120$ $ar^7 - ar^3 = 120$ $a\left(\frac{1}{2}\right)^7 - a\left(\frac{1}{2}\right)^3 = 120$ $\frac{-15}{128} a = 120$ $a = \frac{120}{\frac{-15}{128}}$ $a = -1\,024$	1 1 1	
	(ii) $S_\infty = \frac{-1\,024}{1 - \left(\frac{1}{2}\right)}$ $= -2\,048$	1	

[illegible]

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
3	Jarak yang dilalui dalam nisbah sama → Janjang geometri <i>The distance travelled are in the same ratio → Geometric progression</i> $T_1: A \rightarrow C$ $T_2: C \rightarrow D$ $T_3: D \rightarrow E$ $T_1 + T_2 = \frac{629}{4}$ $a + ar^{2-1} = \frac{629}{4}$ $a + ar = \frac{629}{4}$ $a(1 + r) = \frac{629}{4} \dots \textcircled{1}$ $T_3 = \frac{4\,913}{80}$ $ar^{3-1} = \frac{4\,913}{80}$ $ar^2 = \frac{4\,913}{80} \dots \textcircled{2}$ $\frac{\textcircled{2}}{\textcircled{1}}; \frac{ar^2}{a(1+r)} = \frac{\left(\frac{4\,913}{80}\right)}{\left(\frac{629}{4}\right)}$ $\frac{r^2}{1+r} = \frac{289}{740}$ $740r^2 = 289 + 289r$ $740r^2 - 289r - 289 = 0$ $(20r - 17)(37r + 17) = 0$ $20r - 17 = 0, \quad 37r + 17 = 0$ $r = \frac{17}{20}; \quad r = -\frac{17}{37} \text{ (abai / ignore)}$ Dari / From $\textcircled{1}$, $a(1+r) = \frac{629}{4}$ $a\left(1 + \frac{17}{20}\right) = \frac{629}{4}$ $\frac{37}{20} a = \frac{629}{4}$ $a = \frac{\left(\frac{629}{4}\right)}{\left(\frac{37}{20}\right)}$ $a = 85$	1 1 1 1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	Jumlah jarak / <i>Total distance</i> = S_{∞} $= \frac{85}{1 - \frac{17}{20}}$ $= 566 \frac{2}{3} \text{ cm}$	1	
	Purata laju / <i>Average speed</i> = $\frac{566 \frac{2}{3} \text{ cm}}{60 \text{ s}}$ $= 9.44 \text{ cm s}^{-1}$	1	
	$9.44 \text{ cm s}^{-1} < 10 \text{ cm s}^{-1}$	1	
	Purata laju guli adalah tidak melebihi 10 cm s^{-1}. <i>The average speed of the marble does not exceed 10 cm s^{-1}.</i>	1	
			10

Bab 6

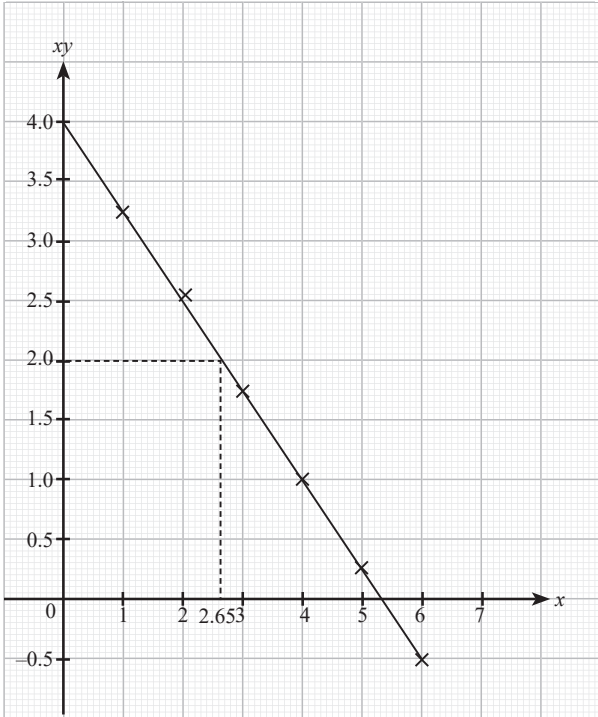
HUKUM LINEAR

KERTAS 1

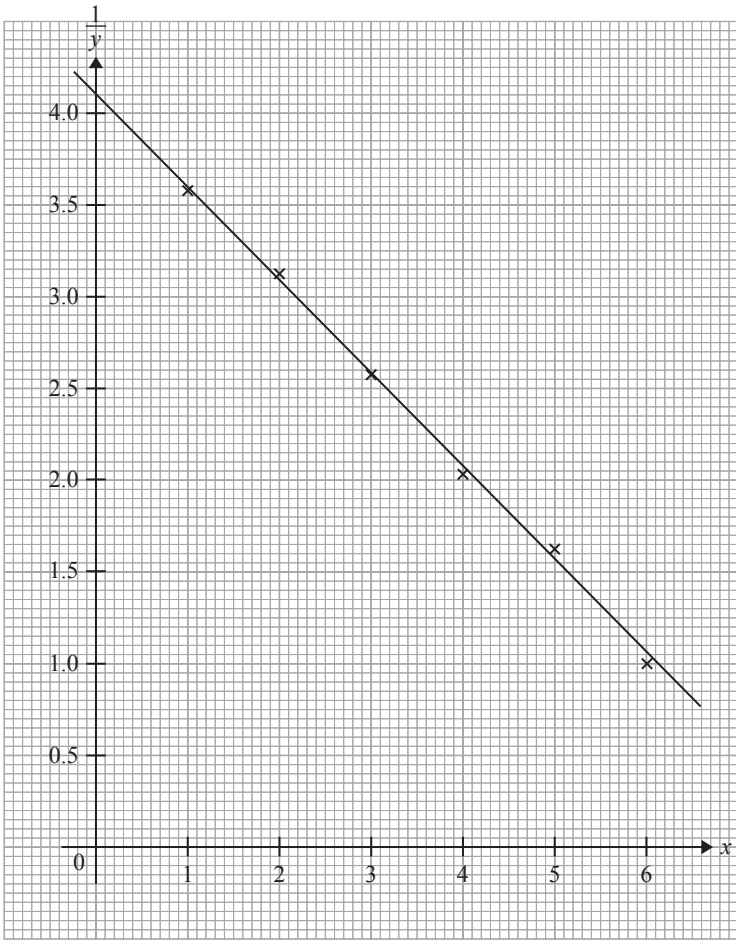
Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
1	(a) L_1 lebih sesuai kerana garis lurus tersebut melalui sebanyak mungkin titik dan terdapat jumlah titik yang sama di kedua-dua belah garis lurus. <i>L_1 is suitable because it passes through as many points as possible and there is equal number of points on both sides of the straight line.</i>	1	
	(b) $Y = mX + c$ $\frac{1}{y} = \frac{(7-4)}{(6-2)}(x^2) + c$ $\frac{1}{y} = \frac{3}{4}x^2 + c$ Pada / At $(10, 9)$, $9 = \frac{3}{4}(10) + c$ $9 = \frac{15}{2} + c$ $\frac{3}{2} = c$ $\frac{1}{y} = \frac{3}{4}x^2 + \frac{3}{2}$ $\frac{1}{y} = \frac{3x^2 + 6}{4}$ $\frac{y}{1} = \frac{4}{3x^2 + 6}$ $y = \frac{4}{3x^2 + 6}$	1	
		1	
		1	
			4

Bahagian B

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks														
1	(a) <table border="1"><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>xy</td><td>3.25</td><td>2.56</td><td>1.74</td><td>1.00</td><td>0.25</td><td>-0.54</td></tr></table> 	x	1	2	3	4	5	6	xy	3.25	2.56	1.74	1.00	0.25	-0.54	1 3	10
	x	1	2	3	4	5	6										
xy	3.25	2.56	1.74	1.00	0.25	-0.54											
(b) (i) $y^2 = \frac{4}{x^2}$ $x^2 y^2 = 4$ $(xy)^2 = 4$ $xy = 2$ $x = 2.65$ (ii) $y + \sqrt{h} = \frac{k^2}{x}$ $xy + x\sqrt{h} = k^2$ $xy = (-\sqrt{h})x + k^2$ $m = \frac{4-1}{0-4}$ $= -\frac{3}{4}$ $m = -\sqrt{h}$ $-\sqrt{h} = -\frac{3}{4}$ $\sqrt{h} = \frac{3}{4}$ $h = \frac{9}{16}$ $c = k^2$ $k^2 = 4$ $k = 2$	2 1 1 1 1																

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks														
	(b)	3															
	(c) $x^a = by$ $\log_{10} x^a = \log_{10} by$ $a \log_{10} x = \log_{10} b + \log_{10} y$ $\log_{10} y = a \log_{10} x - \log_{10} b$ $Y = mX + c$ $m = a = \frac{0.8 - 0.2}{0.9 - 0.5}$ $a = \frac{3}{2}$ $-\log_{10} b = -0.54$ $\log_{10} b = 0.54$ $b = 10^{0.54}$ $b = 3.4674$	1 1 1 1 1		10													
4	(a) <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>$\frac{1}{y}$</td><td>3.57</td><td>3.13</td><td>2.56</td><td>2.04</td><td>1.64</td><td>1</td></tr></table>	x	1	2	3	4	5	6	$\frac{1}{y}$	3.57	3.13	2.56	2.04	1.64	1	1	
x	1	2	3	4	5	6											
$\frac{1}{y}$	3.57	3.13	2.56	2.04	1.64	1											

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	(b) 	3	
	(c) (i) Apabila / When $x = 4.5$, $\frac{1}{y} = 1.825$ $y = \frac{1}{1.825}$ $y = 0.5479$ (ii) $\frac{y}{1} = \frac{a}{b-x}$ $\frac{1}{y} = \frac{b-x}{a}$ $\frac{1}{y} = -\frac{1}{a}x + \frac{b}{a}$ $Y = mX + c$ $-\frac{1}{a} = m$ $-\frac{1}{a} = \frac{3.5 - 3.85}{1.2 - 0.5}$ $-\frac{1}{a} = -\frac{1}{2}$ $a = 2$	1 1 1 1 1	

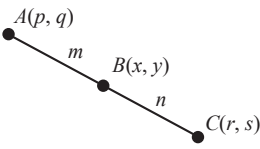
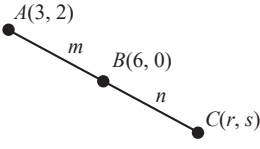
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah markah Total marks
	$\frac{b}{a} = c$ $\frac{b}{2} = 4.10$ $b = 2(4.10)$ $b = 8.20$	1	10

Bab 7

GEOMETRI KOORDINAT

KERTAS 1

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) $\frac{q-y}{y-s} = \frac{m}{n}$ $nq - ny = my - ms$ $ms + nq = (m+n)y$ $y = \frac{ms + nq}{m+n}$ $\frac{x-p}{r-x} = \frac{m}{n}$ $nx - np = mr - mx$ $(m+n)x = mr + np$ $x = \frac{mr + np}{m+n}$ $(x, y) = \left(\frac{mr + np}{m+n}, \frac{ms + nq}{m+n} \right)$ 	1	
		1	
	(b) (i) $\frac{m}{n} = \frac{6-3}{r-6}$ $\frac{m}{n} = \frac{3}{r-6}$ $m \leq n$ $r-6 \geq 3$ $r \geq 9$ $\frac{m}{n} = \frac{2-0}{0-s}$ $\frac{m}{n} = \frac{2}{-s}$ $m \leq n$ $2 \leq -s$ $s \leq -2$ (ii) $m_{AB} = \frac{2-0}{3-6} = -\frac{2}{3}$ $m = -\frac{p}{6}$ $-\frac{p}{6} = -\frac{2}{3}$ $p = 4$ 	1	
		1	
		1	
		1	6

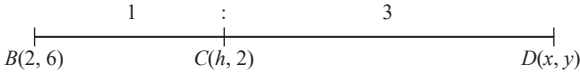
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(b) $PR = 2.5x$	1	
	$\sqrt{\left(x - \frac{3}{2}\right)^2 + \left[y - \left(-\frac{1}{2}\right)\right]^2} = 2.5x$	1	
	$\left(\frac{2x-3}{2}\right)^2 + \left(\frac{2y+1}{2}\right)^2 = \left(\frac{5x}{2}\right)^2$		
	$\frac{4x^2 - 12x + 9}{4} + \frac{4y^2 + 4y + 1}{4} = \frac{25x^2}{4}$		
	$-21x^2 - 12x + 4y^2 + 4y + 10 = 0$	1	
	(c) $\frac{1}{2} \begin{vmatrix} 2 & 8 & 0 & 2 \\ 12 & 9 & y & 12 \end{vmatrix} = 30$	1	
	$ 2(9) + 8y + 0(12) - 12(8) - 9(0) - 2y = 60$		
	$ 18 + 8y - 96 - 2y = 60$	1	
	$18 + 8y - 96 - 2y = 60$		
	$y = 23$ (Abaikan / Ignore)		
	atau / or		
	$18 + 8y - 96 - 2y = -60$		
	$y = 3$	1	
			8

KERTAS 2

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $-2m = -1$	1	
	$m = \frac{1}{2}$		
	$y - (-2) = \frac{1}{2}(x + 8)$	1	
	$y = \frac{1}{2}x + 2$	1	
	(ii) $\frac{1}{2}x + 2 = -2x - 3$	1	
	$\frac{5}{2}x = -5$		
	$x = -2$		
	$y = -2(-2) - 3$		
	$= 1$		
	$\therefore Q(-2, 1)$	1	
	(b) $(-2, 1) = \left[\frac{2(-8) + 3(x)}{2+3}, \frac{2(-2) + 3(y)}{2+3} \right]$	1	
	$\frac{-16 + 3x}{5} = -2$		
	$x = 2$		
	$\frac{-4 + 3y}{5} = 1$		
	$y = 3$		
	$\therefore T(2, 3)$	1	7

Bahagian B

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
2	(a) (i) $(x, y) = \left(\frac{3+7}{2}, \frac{2+(-6)}{2}\right)$ $= (5, -2)$ $(5, -2) = \left(\frac{2x+3(-1)}{2+3}, \frac{2y+3(-8)}{2+3}\right)$ $5 = \frac{2x-3}{5} \quad -2 = \frac{2y-24}{5}$ $25 = 2x-3 \quad -10 = 2y-24$ $2x = 28 \quad 2y = 14$ $x = 14 \quad y = 7$ $D(14, 7)$ (ii) Luas / Area $\triangle CDE$ $= \frac{1}{2} \begin{vmatrix} 5 & 14 & 7 & 5 \\ -2 & 7 & -6 & -2 \end{vmatrix}$ $= \frac{1}{2} [5 \times 7 + 14 \times (-6) + 7 \times (-2)] - [-2 \times 14 + 7 \times 7 + (-6) \times 5]$ $= \frac{1}{2} -54$ $= 27 \text{ unit}^2$	1 1 1 1 1 1	10
	(b) (i) $m_{PA} = \frac{y-2}{x-3}, m_{PB} = \frac{y-(-8)}{x-(-1)}$ $\left(\frac{y-2}{x-3}\right)\left(\frac{y-(-8)}{x-(-1)}\right) = -1$ $y^2 + 8y - 2y - 16 = -(x^2 + x - 3x - 3)$ $x^2 + y^2 - 2x + 6y - 19 = 0$ (ii) $x = 5, y = -2$ $5^2 + (-2)^2 - 2(5) + 6(-2) - 19 = -12$ $-12 \neq 0$, maka lokus P tidak melalui C $-12 \neq 0$, therefore locus P does not pass through point C	1 1 1 1 1 1	
3	(a) (i)  $C(h, 2) = \left(\frac{3(2) + (1)(x)}{1+3}, \frac{(3)(6) + (1)(y)}{1+3}\right)$ $= \left(\frac{6+x}{4}, \frac{18+y}{4}\right)$ $\frac{6+x}{4} = h \quad , \quad \frac{18+y}{4} = 2$ $6+x = 4h \quad , \quad 18+y = 8$ $x = 4h-6 \quad , \quad y = 8-18$ $y = -10$ $\therefore D(4h-6, -10)$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(ii) Luas $\triangle ACD$ / Area of $\triangle ACD = 27 \text{ unit}^2$ $\frac{1}{2} \begin{vmatrix} -1 & h & 4h-6 & -1 \\ 2 & 0 & -10 & 0 \end{vmatrix} = 27$ $\begin{vmatrix} [(-1)(2) + (h)(-10) + (0)(4h-6)] \\ -[(0)(h) + (2)(4h-6) + (-10)(-1)] \end{vmatrix} = 54$ $ (-2 - 10h) - (8h - 12 + 10) = 54$ $ -2 - 10h - 8h + 12 - 10 = 54$ $ -18h = 54$ $-18h = 54$, $(-18h) = -54$ $h = -3$ (abaikan / ignore) $h = 3$ $\therefore h = 3$	1 1	
	(b) (i) $D(4h - 6, -10)$ apabila / when $h = 3$ $\therefore D(6, -10)$ $BP = PD$ $\sqrt{(2-x)^2 + (6-y)^2} = \sqrt{(6-x)^2 + (-10-y)^2}$ $\sqrt{x^2 - 4x + 4 + y^2 - 12y + 36} = \sqrt{x^2 - 12x + 36 + y^2 + 20y + 100}$ $x^2 + y^2 - 4x - 12y + 40 = x^2 + y^2 - 12x + 20y + 136$ $-4x + 12x - 12y - 20y + 40 - 136 = 0$ $8x - 32y - 96 = 0$ (ii) Pintasan paksi-y / Intersection of y-axis, $x = 0$ $8x - 32y - 96 = 0$ $8(0) - 32y - 96 = 0$ $-32y = 96$ $y = -3$ $\therefore E(0, -3)$ $m_{BA} = \frac{6-0}{2-(-1)} = 2$ $m_{CE} = \frac{-3-2}{0-3} = \frac{5}{3}$ $m_{BA} \neq m_{CE}$ $\therefore BA$ adalah tidak selari dengan CE. BA is not parallel to CE.	1 1 1 1 1 1	10
4	(a) $m_{PQ} = -3m$ $\frac{4-1}{-1-1} = -3m$ $-\frac{3}{2} = -3m$ $-\frac{3}{2} = m$ $\frac{1}{2} = m \text{ (Ditunjukkan / Shown)}$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(b) Katakan / Let, $R(x, y)$ $m_{QR} = m$ $\frac{4-y}{-1-x} = \frac{1}{2}$ $2(4-y) = 1(-1-x)$ $8-2y = -1-x$ $-2y = -1-x-8$ $2y = 9+x \dots \textcircled{1}$ $m_{PR} = 3m$ $\frac{1-y}{1-x} = 3\left(\frac{1}{2}\right)$ $\frac{1-y}{1-x} = \frac{3}{2}$ $3(1-x) = 2(1-y)$ $3-3x-2 = -2y$ $1-3x = -2y$ $3x-1 = 2y \dots \textcircled{2}$ $\textcircled{1} = \textcircled{2};$ $3x-1 = 9+x$ $3x-x = 9+1$ $2x = 10$ $x = 5$ Dari / From $\textcircled{1}$, $2y = 9+x$ $2y = 9+5$ $2y = 14$ $y = 7$ $\therefore R(5, 7)$	1	
		1	
		1	
		1	
	(c) (i) Luas / Area, ΔPQR $= \frac{1}{2} \begin{vmatrix} 1 & -1 & 5 & 1 \\ 1 & 4 & 7 & 1 \end{vmatrix}$ $= \frac{1}{2} [(1)(4) + (-1)(7) + (5)(1)] - [(1)(-1) + (4)(5) + (7)(1)]$ $= \frac{1}{2} 2 - 26 $ $= \frac{1}{2} -24 $ $= \frac{1}{2}(24)$ $= 12 \text{ unit}^2$	1	
		1	

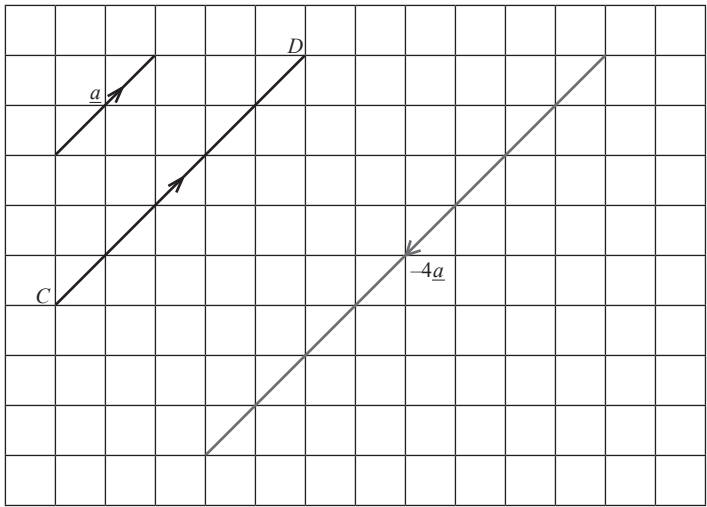
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(ii) $RU = \frac{5}{2}QU$	1	10
	$\sqrt{(x-5)^2 + (y-7)^2} = \frac{5}{2}\sqrt{[(x-(-1))]^2 + (y-4)^2}$	1	
	$\sqrt{x^2 - 10x + 25 + y^2 - 14y + 49} = \frac{5}{2}\sqrt{x^2 + 2x + 1 + y^2 - 8y + 16}$		
	$x^2 + y^2 - 10x - 14y + 74 = \left(\frac{5}{2}\right)^2(x^2 + y^2 + 2x - 8y + 17)$		
	$x^2 + y^2 - 10x - 14y + 74 = \frac{25}{4}(x^2 + y^2 + 2x - 8y + 17)$		
	$4x^2 + 4y^2 - 40x - 56y + 296 = 25x^2 + 25y^2 + 50x - 200y + 425$		
	$0 = 21x^2 + 21y^2 + 90x - 144y + 129$		
	$0 = 7x^2 + 7y^2 + 30x - 48y + 43$	1	

Bab 8

VEKTOR

KERTAS 1

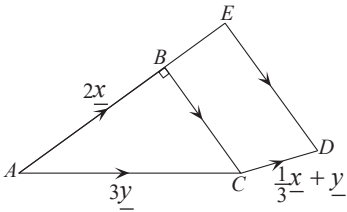
Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $\overrightarrow{CD} = \underline{a} + \underline{a} + \frac{1}{2}\underline{a}$ $\overrightarrow{CD} = \frac{5}{2}\underline{a}$	1	2
	(ii) 	1	
2	(a) $ \overrightarrow{ED} + \overrightarrow{DB} + \overrightarrow{BE} = 0$	1	
	(b) $\overrightarrow{EC} = 11\underline{i} + 4\underline{j} + 10\underline{j}$ $= 15\underline{i} + 10\underline{j}$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	$(c) \begin{pmatrix} 1 \\ 1 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix} t = \begin{pmatrix} 5 \\ p \end{pmatrix}$ $1 + 3t = 5$ $t = \frac{4}{3}$ $1 + 4t = p$ $1 + 4\left(\frac{4}{3}\right) = p$ $\frac{3 + 16}{3} = p$ $p = \frac{19}{3}$	1 1 1	6
3	$\vec{OP} = 2\vec{i} + 3\vec{j}$ $\vec{OQ} = q\vec{i} + 2q\vec{j}$ $\vec{PQ} = \vec{PO} + \vec{OQ}$ $= -2\vec{i} - 3\vec{j} + q\vec{i} + 2q\vec{j}$ $= (-2 + q)\vec{i} + (-3 + 2q)\vec{j}$ Vektor unit / Unit vector, $ \vec{PQ} = 1$ Maka / Then, $\sqrt{(-2 + q)^2 + (-3 + 2q)^2} = 1$ $4 - 4q + q^2 + 9 - 12q + 4q^2 = 1$ $5q^2 - 16q + 12 = 0$ $(5q - 6)(q - 2) = 0$ $q = \frac{6}{5}, q = 2$	1 1 1 1	4
4	$(a) \vec{SP} = -2\vec{i} + 3\vec{j}$ $(b) (i) \vec{SP} + 3\vec{PQ} = 13\vec{i} + 15\vec{j}$ $(-2\vec{i} + 3\vec{j}) + 3(5\vec{i} + m\vec{j}) = 13\vec{i} + 15\vec{j}$ $-2\vec{i} + 3\vec{j} + 15\vec{i} + 3m\vec{j} = 13\vec{i} + 15\vec{j}$ $13\vec{i} + (3m + 3)\vec{j} = 13\vec{i} + 15\vec{j}$ $3m + 3 = 15$ $3m = 12$ $m = 4$ $(ii) \vec{PQ} = 5\vec{i} + 4\vec{j}$ $ \vec{PQ} = \sqrt{5^2 + 4^2}$ $ \vec{PQ} = \sqrt{41}$ Vektor unit / Unit vector = $\frac{5\vec{i} + 4\vec{j}}{\sqrt{41}}$	1 1 1 1	5

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
5	(a) (i) $\overrightarrow{PQ} = \overrightarrow{PO} + \overrightarrow{OQ}$ $\overrightarrow{PQ} = -\overrightarrow{OP} + \overrightarrow{OQ}$ $\overrightarrow{PQ} = -(4h\mathbf{i} + 2h\mathbf{j}) + (-h\mathbf{j})$ $\overrightarrow{PQ} = -4h\mathbf{i} - 2h\mathbf{j} - h\mathbf{j}$ $\overrightarrow{PQ} = -4h\mathbf{i} - 3h\mathbf{j}$ (ii) $\overrightarrow{PQ} = -4h\mathbf{i} - 3h\mathbf{j}$ $\sqrt{(-4h)^2 + (-3h)^2} = 1$ $\sqrt{16h^2 + 9h^2} = 1$ $\sqrt{25h^2} = 1$ $h^2 = \frac{1}{25}$ $h = \pm \frac{1}{5}$ $\therefore h = \frac{1}{5}$	1 1 1 1	8
	(b) $P\left(\frac{4}{5}, \frac{2}{5}\right), Q\left(0, -\frac{1}{5}\right), R\left(-8, -\frac{31}{5}\right)$ $\overrightarrow{QR} = \overrightarrow{QO} + \overrightarrow{OR}$ $\overrightarrow{QR} = -\overrightarrow{OQ} + \overrightarrow{OR}$ $\overrightarrow{QR} = -\left(-\frac{1}{5}\mathbf{j}\right) + \left(-8\mathbf{i} - \frac{31}{5}\mathbf{j}\right)$ $\overrightarrow{QR} = \frac{1}{5}\mathbf{j} - 8\mathbf{i} - \frac{31}{5}\mathbf{j}$ $\overrightarrow{QR} = -8\mathbf{i} - 6\mathbf{j}$ $\overrightarrow{PQ} = -4h\mathbf{i} - 3h\mathbf{j}$ $\overrightarrow{PQ} = -\frac{4}{5}\mathbf{i} - \frac{3}{5}\mathbf{j}$ $\overrightarrow{PQ} = \frac{1}{10}(-8\mathbf{i} - 6\mathbf{j})$ $\overrightarrow{PQ} = \frac{1}{10}\overrightarrow{QR}$ $\therefore \overrightarrow{PQ}$ dan $\overrightarrow{QR}$ adalah selari dan Q ialah titik sepunya. Maka, P, Q, dan R adalah segaris. $\overrightarrow{PQ}$ is parallel to $\overrightarrow{QR}$ and Q is the common point. So, P, Q and R are collinear.	1 1 1 1	

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $\vec{OX} = \vec{OA} + \vec{AX}$ $= 4\vec{a} + \vec{b}$ (ii) $\vec{BY} = \vec{BA} + \vec{AY}$ $= -3\vec{b} + (-\vec{a})$ $= -3\vec{b} - \vec{a}$	1 1 1	8
	(b) $\vec{BP} = k\vec{BY}$ $\vec{OP} = \lambda\vec{OX}$ $\vec{BP} = \vec{BO} + \vec{OP}$ $k\vec{BY} = (\vec{BA} + \vec{AO}) + \lambda(4\vec{a} + \vec{b})$ $k(-\vec{a} - 3\vec{b}) = (-3\vec{b} - 4\vec{a}) + \lambda(4\vec{a} + \vec{b})$ $-k\vec{a} - 3k\vec{b} = (-4 + 4\lambda)\vec{a} + (-3 + \lambda)\vec{b}$ $-4 + 4\lambda = -k$ ① $-3 + \lambda = -3k$ ② $\lambda = 3 - 3k$ ③ Gantikan ③ ke dalam ① Substitute ③ into ① $-4 + 4(3 - 3k) = -k$ $-4 + 12 - 12k = -k$ $k = \frac{8}{11}$ $\vec{BP} = \frac{8}{11}\vec{BY}$ $BP : PY = 8 : 3$	1 1 1 1 1	
2	(a) (i) $\vec{BC} = \vec{BA} + \vec{AC}$ $\vec{BC} = -\vec{AB} + \vec{AC}$ $\vec{BC} = -2\vec{x} + 3\vec{y}$  (ii) $\vec{ED} = \vec{EA} + \vec{AC} + \vec{CD}$ $\vec{ED} = -\vec{AE} + \vec{AC} + \vec{CD}$ $\vec{ED} = -\frac{3}{2}\vec{AB} + 3\vec{y} + \frac{1}{3}\vec{x} + \vec{y}$ $\vec{ED} = -\frac{3}{2}(2\vec{x}) + 4\vec{y} + \frac{1}{3}\vec{x}$ $\vec{ED} = -3\vec{x} + 4\vec{y} + \frac{1}{3}\vec{x}$ $\vec{ED} = 4\vec{y} - \frac{8}{3}\vec{x}$	1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(ii) $\overrightarrow{BQ} = \overrightarrow{BO} + \overrightarrow{OQ}$ $= -\underline{b} + k\left(\frac{2}{3}\underline{a} + \frac{1}{3}\underline{b}\right)$ $= -\underline{b} + \frac{2}{3}k\underline{a} + \frac{k}{3}\underline{b}$	1 1	10
	(b) $\overrightarrow{BQ} = h\overrightarrow{BC}$ $-\underline{b} + \frac{2}{3}k\underline{a} + \frac{k}{3}\underline{b} = h(-\underline{b} + 3\underline{a})$ $\left(-1 + \frac{k}{3}\right)\underline{b} + \frac{2}{3}k\underline{a} = -h\underline{b} + 3h\underline{a}$ Banding / Compare: $-1 + \frac{k}{3} = -h$ $\frac{2}{3}k = 3h$ $\frac{2}{3}k = 3\left(1 - \frac{k}{3}\right)$ $k = \frac{9}{5}$ $h = 1 - \frac{9}{15} = \frac{2}{5}$	1 1 1 2	
	(c) $5BQ = 2BC$ $BQ : QC = 2 : 3$	1	

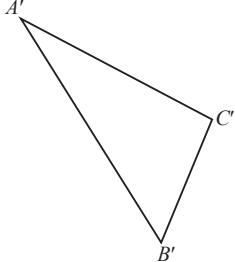
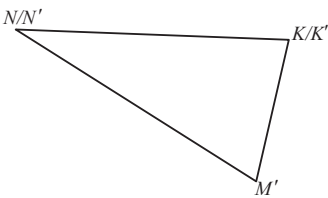
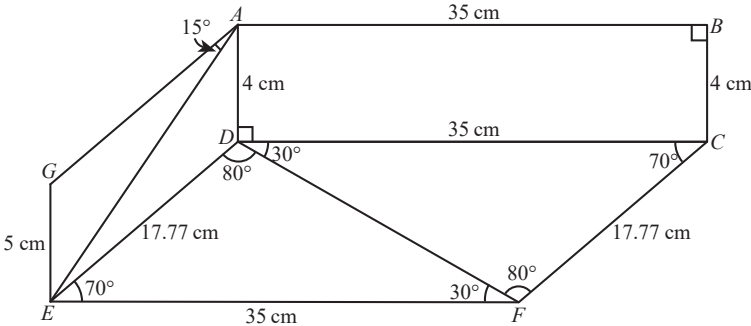
Bab 9

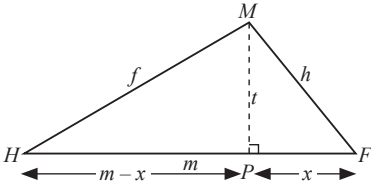
PENYELESAIAN SEGI TIGA

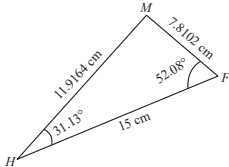
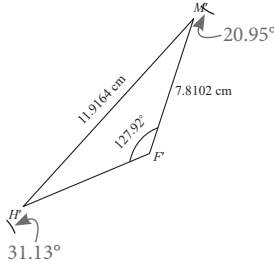
KERTAS 1

Bahagian C

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $\frac{1}{2}(2.8)(3) \sin 143^\circ = \frac{1}{2}(3)(3.6) \sin \angle BCD$ $\angle BCD = 152.09^\circ$ (ii) $AC^2 = 2.8^2 + 3^2 - 2(2.8)(3) \cos / \cos 143^\circ$ $AC = 5.50 \text{ cm}$ $CE = 5.50 - 4 = 1.50 \text{ cm}$ (iii) $\frac{2.8}{\sin \angle BCA} = \frac{5.50}{\sin 143^\circ}$ $\sin \angle BCA = 0.3064$ $\angle BCA = 17.84^\circ$ $BE^2 = 3^2 + 1.5^2 - 2(3)(1.5) \cos / \cos 17.84^\circ$ $BE = 1.64 \text{ cm}$	1 1 1 1 1 1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(b) (i)  (ii) $\angle A'B'C' = 37^\circ$	1 1	10
2	(a) (i) $(\sqrt{p})^2 = 10^2 + 12^2 - 2(10)(12) \cos 60^\circ$ $p = 124$ (ii) $\frac{MN}{\sin 40^\circ} = \frac{\sqrt{124}}{\sin 110^\circ}$ $MN = 7.617$ Luas / Area $= \frac{1}{2}(10)(12) \sin 60^\circ + \frac{1}{2}(\sqrt{124})(7.617) \sin 30^\circ$ $= 73.16$ (b)  $\angle N'K'M' = 80^\circ$	1 1 2 1 2 1 1	10
3	 (a) (i) $\frac{CF}{\sin 30^\circ} = \frac{35}{\sin 80^\circ}$ $CF = \frac{35 \sin 30^\circ}{\sin 80^\circ}$ $CF = 17.77 \text{ cm}$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(ii) $AC = \sqrt{35^2 + 4^2}$ $AC = 35.23 \text{ cm}$ $CE^2 = 35^2 + 17.77^2 - 2(35)(17.77) \cos / \cos 110^\circ$ $CE = \sqrt{1966.2118}$ $CE = 44.34 \text{ cm}$ $AE^2 = 4^2 + 17.77^2 - 2(4)(17.77) \cos / \cos 90^\circ$ $AE = \sqrt{331.7729}$ $AE = 18.21 \text{ cm}$ $s = \frac{35.23 + 44.34 + 18.21}{2}$ $= 48.89$ Luas $\triangle ACE$ / Area of $\triangle ACE$ $= \sqrt{s(s-a)(s-b)(s-c)}$ $= \sqrt{48.89(48.89 - 35.23)(48.89 - 44.34)(48.89 - 18.21)}$ $= 305.33 \text{ cm}^2$	1 1 1 1	10
	(b) $\frac{\sin \angle AGE}{18.21} = \frac{\sin 15^\circ}{5}$ $\sin \angle AGE = 0.9426$ $\angle AGE = \sin^{-1}(0.9426) \quad \angle AGE = 70.49^\circ$ $\angle GEA = 180^\circ - 15^\circ - 70.49^\circ$ $= 94.51^\circ$ $\frac{AG}{\sin 94.51^\circ} = \frac{5}{\sin 15^\circ}$ $AG = \frac{5 \sin 94.51^\circ}{\sin 15^\circ}$ $AG = 19.26 \text{ cm}$	1 1 1 1	
4	(a)  $PF = x, PH = m - x, MP = t$ Dengan Teorem Pythagoras / By Pythagoras Theorem, $f^2 = t^2 + (m - x)^2$ $f^2 = t^2 + m^2 - 2mx + x^2 \dots \textcircled{1}$ $h^2 = t^2 + x^2 \dots \textcircled{2}$ $\cos / \cos \angle F = \frac{x}{h}$ $x = h \cos / \cos \angle F \dots \textcircled{3}$ $\textcircled{2}$ dan / and $\textcircled{3} \rightarrow \textcircled{1}$; $f^2 = t^2 + x^2 + m^2 - 2mx$ $f^2 = h^2 + m^2 - 2m(h \cos / \cos \angle F)$ $f^2 = h^2 + m^2 - 2mh \cos / \cos \angle F$	1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(b) $\frac{\sin \angle H}{7.8102} = \frac{\sin 52.08^\circ}{11.9164}$ $\sin \angle H = 0.5170$ $\angle H = \sin^{-1}(0.5170)$ $\angle H = 31.13^\circ$   $\angle F'M'H' = 180^\circ - 31.13^\circ - 127.92^\circ$ $= 20.95^\circ$ Luas / Area = $\frac{1}{2}ab \sin c$ $= \frac{1}{2}(11.9164)(7.8102) \sin 20.95^\circ$ $= 16.6386 \text{ cm}^2$	1 1 1	10

Bab 10

NOMBOR INDEKS

KERTAS 2

Bahagian C

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	(a) (i) $x = 80$	1	
	(ii) $\frac{2.00}{y} \times 100 = 80$	1	
	$y = \text{RM}2.50$	1	
	(b) $\bar{I}_{20 / 18} = \frac{108 \times 60 + 104 \times 35 + 80 \times 5}{100}$	2	
	$= 105.20$	1	
	(c) $I_{21 / 20} = 140$	1	
	$I_{21 / 18} = \frac{105.20 \times 140}{100}$	1	
$= 147.28$	1		
$\frac{(43 - 5)}{P_{18}} \times 100 = 147.28$	1		
$P_{18} = \text{RM}25.80$	1	10	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
2	(a) (i) $\frac{z}{15}(100) = 130$ $z = \text{RM}19.50$	1 1	10
	(ii) $\frac{y}{x}(100) = 140, x + 6 = y$ $140x = (x + 6)100$ $x = \text{RM}15$ $15 + 6 = y$ $y = \text{RM}21$	1 1	
	(b) $\frac{130(5) + 140p + 160q + 110(3)}{(5 + p + q + 3)} = 132$ $980 + 140p + 160q = 1\,056 + 132p + 132q$ $8p = 1\,056 - 980 - 28q$ $p = \frac{19}{2} - \frac{7}{2}q$	2 1	
	(c) $\bar{I} = \frac{132 \times 120}{100}$ $= 158.4$ $\frac{x}{\text{RM}40} \times 100 = 158.4$ $x = \text{RM}63.36$	1 1	
	Harga biskut tahun 2022 / Biscuit's price in 2022 $= \frac{115}{100} \times \text{RM}63.36$ $= \text{RM}72.86$	1	
3	(a) $x = \frac{27.5}{25} \times 100$ $= 110$	1	
	$\frac{22.5}{y} \times 100 = 150$ $\frac{22.5}{y} = 1.5$ $y = 15$	1 1	
	(b) $\frac{(3)(110) + (2)(112.5) + (m)(150) + (4)(120)}{3 + 2 + m + 4} = 127.5$ $\frac{1\,035 + 150m}{9 + m} = 127.5$ $1\,035 + 150m = 1\,147.5 + 127.5m$ $22.5m = 112.5$ $m = 5$	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	(c) (i) $\bar{I}_{2025/2021} = 127.5 \times \frac{120}{100}$ $\bar{I}_{2025/2021} = 153$ (ii) $\frac{P_{2025}}{100} \times 100 = 153$ $P_{2025} = \text{RM}153$ (iii) $\frac{(3)(110) + (2)(112.5) + (5)(I_C) + (4)(120)}{3 + 2 + 5 + 4} = 153$ $\frac{1\ 035 + 5I_C}{14} = 153$ $1\ 035 + 5I_C = 2\ 142$ $5I_C = 1\ 107$ $I_C = 221.4$ $\frac{P_{2025}}{15} \times 100 = 221.4$ $P_{2025} = \text{RM}33.21$ $\frac{33.21 - 15}{15} \times 100\% = 121.4\%$	1 1 1 1 1 1	10
4	(a) $\bar{I}_{\frac{23}{22}} = 130$ $\frac{2.10}{x} \times 100 = 130$ $\frac{2.10}{x} = \frac{130}{100}$ $x = \frac{2.10 \times 100}{130}$ $x = 1.62$ $y = \frac{2.40}{2.00} \times 100$ $y = 120$ $\bar{I}_{\frac{23}{22}} = 150$ $\frac{z}{1.20} \times 100 = 150$ $z = \frac{150 \times 1.20}{100}$ $z = 1.80$	1 1 1	
	(b) (i) $\bar{I}_{\frac{23}{22}} = 135$ $\frac{(130)(n) + (120)(m + n) + (160)\left(\frac{m}{3}\right) + (150)(2n)}{n + m + n + \frac{m}{3} + 2n} = 135$ $\frac{130n + 120m + 120n + \frac{160}{3}m + 300n}{4n + \frac{4}{3}m} = 135$	1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	$550n + \frac{520}{3}m = 135\left(4n + \frac{4}{3}m\right)$ $550n + \frac{520}{3}m = 540n + 180m$ $550n - 540n = 180m - \frac{520}{3}m$ $10n = \frac{20}{3}m$ $\frac{10}{20} = \frac{m}{n}$ $\frac{3}{2} = \frac{m}{n}$ $\therefore m : n = 3 : 2$ $A : B = n : m + n$ $A : B = 2 : 3 + 2$ $A : B = 2 : 5$	1	
	$(ii) \quad \bar{I}_{23/22} = 135$ $\frac{P_{2023}}{P_{2022}} \times 100 = 135$ $\frac{P_{2023}}{RM25} \times 100 = 135$ $P_{2023} = \frac{135 \times RM25}{100}$ $P_{2023} = RM33.75$ $\bar{I}_{25/23} = 100 + 20.25$ $\frac{P_{2025}}{P_{2023}} \times 100 = 120.25$ $\frac{P_{2025}}{RM33.75} \times 100 = 120.25$ $P_{2025} = \frac{120.25 \times RM33.75}{100}$ $P_{2025} = RM40.58$	1	
	Bilangan kotak / <i>Number of box</i> = $200 \div 40$ = 5 Harga kotak / <i>Price of box</i> = $5 \times RM1.50$ = RM7.50 Jumlah kos pada tahun 2025 / <i>Total cost in the year 2025</i> = RM40.58 + RM7.50 = RM48.08	1	
	RM48.08 > RM45 $\therefore$ Duit yang diperuntukkan adalah tidak mencukupi. <i>The allocated money is not enough.</i>	1	
			10