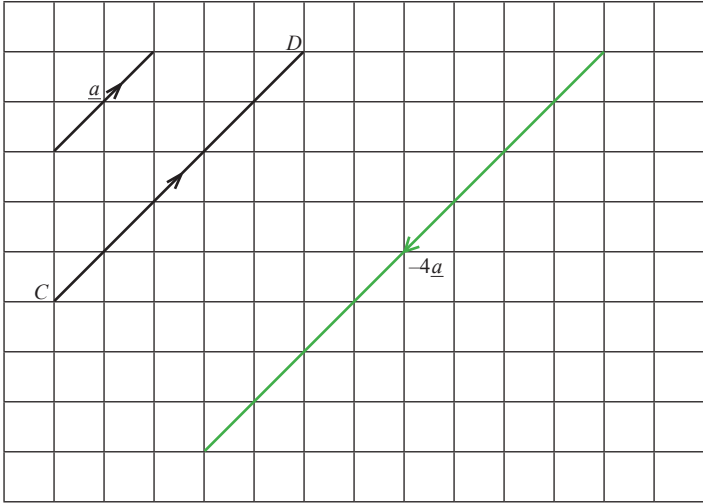
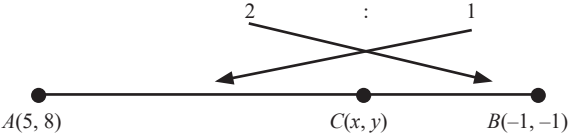
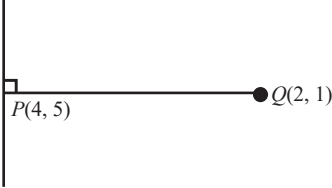


KERTAS 1

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
1	$(y = 4x^2 - 5) \div x^2$ $\frac{y}{x^2} = 4 - \frac{5}{x^2}$ $\frac{y}{x^2} = -5\left(\frac{1}{x^2}\right) + 4$ $Y = m X + C$ $Y = \frac{y}{x^2}$ $X = \frac{1}{x^2}$	<p align="center">1</p> <p align="center">1</p>	<p align="center">2</p>
2	<p>(a) $\{-5, 10, 15, 25\}$</p> <p>(b) $g(x) = 3 - x$ $g(4) = p - 10$ $3 - 4 = p - 10$ $-1 = p - 10$ $-1 + 10 = p$ $p = 9$</p>	<p align="center">1</p> <p align="center">1</p> <p align="center">1</p>	<p align="center">3</p>
3	<p>(a) (i) $\vec{CD} = \underline{a} + \underline{a} + \frac{1}{2}\underline{a}$ $\vec{CD} = \frac{5}{2}\underline{a}$</p> <p>(ii)</p>  <p>(b)</p>  <p>$C(x, y) = \left(\frac{2(-1) + (1)(5)}{2 + 1}, \frac{(2)(-1) + (1)(8)}{2 + 1} \right)$ $= (1, 2)$</p>	<p align="center">1</p> <p align="center">1</p> <p align="center">1</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>(c)</p>  $m_{PQ} = \frac{5-1}{4-2}$ $= 2$ $m_{PQ} \times m_2 = -1$ $2 \times m_2 = -1$ $m_2 = -\frac{1}{2}$ $y - y_1 = m(x - x_1)$ $y - 5 = -\frac{1}{2}(x - 4)$ $y = -\frac{1}{2}x + 2 + 5$ $y = -\frac{1}{2}x + 7$	<p>1</p> <p>1</p> <p>1</p>	<p>7</p>
4	<p>Panjang lengkok = $\frac{\text{Sudut yang dicangkum di pusat}}{360^\circ}$</p> <p>Lilitan bulatan</p> $\frac{s}{2\pi r} = \frac{\theta}{2\pi}$ $s = \frac{\theta}{2\pi} \times 2\pi r$ $s = r\theta$ <p>Length of arc = $\frac{\text{Angle subtended at the centre}}{360^\circ}$</p> <p>Circumference</p> $\frac{s}{2\pi r} = \frac{\theta}{2\pi}$ $s = \frac{\theta}{2\pi} \times 2\pi r$ $s = r\theta$	<p>1</p> <p>1</p>	<p>2</p>
5	$\log_n p = \frac{1}{\log_p \frac{m}{n}}$ $= \frac{1}{\log_p m - \log_p n}$ $= \frac{1}{\frac{1}{\log_m p} - \frac{1}{\log_n p}}$ $= \frac{1}{\frac{1}{x} - \frac{1}{y}}$ $= \frac{1}{\frac{y-x}{xy}}$ $= \frac{xy}{y-x}$	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>

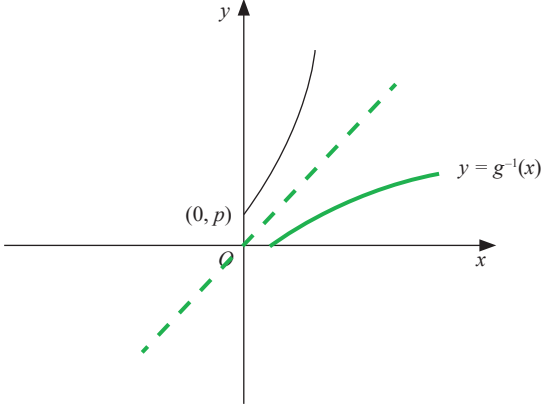
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>(b)</p> $\sin(A + B) - \sin(A - B) = 2p$ $(\sin A \cos B + \cos A \sin B) - (\sin A \cos B - \cos A \sin B) = 2p$ $\sin A \cos B + \cos A \sin B - \sin A \cos B + \cos A \sin B = 2p$ $2 \cos A \sin B = 2p$ $2\left(\frac{\sqrt{4-p^2}}{2}\right) \sin B = 2p$ $\sqrt{4-p^2} \sin B = 2p$ $\sin B = \frac{2p}{\sqrt{4-p^2}}$ $\sin(A + B) - \sin(A - B) = 2p$ $(\sin A \cos B + \cos A \sin B) - (\sin A \cos B - \cos A \sin B) = 2p$ $\sin A \cos B + \cos A \sin B - \sin A \cos B + \cos A \sin B = 2p$ $2 \cos A \sin B = 2p$ $2\left(\frac{\sqrt{4-p^2}}{2}\right) \sin B = 2p$ $\sqrt{4-p^2} \sin B = 2p$ $\sin B = \frac{2p}{\sqrt{4-p^2}}$	<p>1</p> <p>1</p> <p>1</p>	<p>5</p>
9	<p>(a) Luas / Area, $A = 2x(5x - 1)$ $A = 10x^2 - 2x$</p> $\frac{dA}{dx} = 20x - 2$ <p>Apabila / When $x = 3$,</p> $\frac{dA}{dx} = 20(3) - 2$ $\frac{dA}{dx} = 58$ $\frac{\delta A}{\delta x} \approx \frac{dA}{dx}$ $\delta A = \frac{dA}{dx} \times \delta x$ $\delta A = (58)[(3 + p) - 3]$ $\delta A = (58)(p)$ $\delta A = 58p$	<p>1</p> <p>1</p> <p>1</p>	
	<p>(b)</p> <p>(i) $A = \frac{1}{2}(3y + 5y)(38 - 8y)$ $= \frac{1}{2}(8y)(38 - 8y)$ $= 4y(38 - 8y)$ $= 152y - 32y^2$</p> $\frac{dA}{dy}: 152 - 64y = 0$ $-64y = -152$ $y = \frac{-152}{-64}$ $y = 2.375 \text{ m}$ $\frac{d^2A}{dy^2} = -64 < 0$ <p>$\therefore A$ adalah maksimum apabila $y = 2.375 \text{ m}$. <i>A is maximum when $y = 2.375 \text{ m}$.</i></p>	<p>1</p> <p>1</p> <p>1</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>(ii) Luas Q / Area of $Q = 152y - 32y^2$ $= 152(2.375) - 32(2.375)^2$ $= 180.5 \text{ m}^2$</p> <p>Perimeter, $P = 54 \text{ m}$ $2[(x - 1) + x] = 54$ $2(2x - 1) = 54$ $2x - 1 = 27$ $2x = 28$ $x = 14 \text{ m}$</p> <p>Luas P / Area of $P = (x - 1)(x)$ $= (14 - 1)(14)$ $= 182 \text{ m}^2$</p> <p>\therefore Lot P yang akan ditanam dengan rumput yang paling banyak kerana luas P ialah 182 m^2, iaitu 1.5 m^2 lebih banyak daripada luas Q, iaitu 180.5 m^2. <i>Lot P will be planted with most grass because the area of P is 182 m^2, which 1.5 m^2 more than the area of Q, which is 180.5 m^2.</i></p>	<p>1</p> <p>1</p> <p>1</p>	<p>9</p>
10	<p>(a) $\int [3g(x) + 1] dx = 3\left(\frac{1}{x^2 + 1}\right) + \int 1 dx$ $= \frac{3}{x^2 + 1} + x + c$</p> <p>(b) (i) $\int_0^h f(y) dy + \left \int_h^k f(y) dy \right + \int_k^m f(y) dy = \frac{9}{2}$ $\frac{3}{2} + \left \int_h^k f(y) dy \right + \frac{3}{2} = \frac{9}{2}$ $\left \int_h^k f(y) dy \right = \frac{9}{2} - \frac{3}{2} - \frac{3}{2}$ $\left \int_h^k f(y) dy \right = \frac{3}{2}$ $\int_h^k f(y) dy = -\frac{3}{2}$</p> <p>$\int_0^k f(y) dy = \int_0^h f(y) dy + \int_h^k f(y) dy$ $= \frac{3}{2} + \left(-\frac{3}{2}\right)$ $= 0$</p> <p>(ii) $\int_h^k x dy + \int_k^m \frac{5}{4} f(y) dy = \int_h^k f(y) dy + \frac{5}{4} \int_k^m f(y) dy$ $= -\frac{3}{2} + \frac{5}{4}\left(\frac{3}{2}\right)$ $= -\frac{3}{2} + \frac{15}{8}$ $= \frac{3}{8}$</p>	<p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>6</p>

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
11	<p>(a) ${}^{n+1}C_2 = 4n$</p> $\frac{(n+1)!}{2![(n+1)-2]!} = 4n$ $\frac{(n+1)!}{2!(n-1)!} = 4n$ $\frac{(n+1)(n)(n-1)!}{2!(n-1)!} = 4n$ $\frac{n(n+1)}{2} = 4n$ $n^2 + n = 8n$ $n^2 + n - 8n = 0$ $n^2 - 7n = 0$ $n(n-7) = 0$ $n = 0 \quad ; \quad n - 7 = 0$ $n = 7$ <p>$\therefore n = 7$</p> <p>Jumlah bilangan poligon / Total number of polygons $= {}^7C_3 + {}^7C_4 + {}^7C_5 + {}^7C_6 + {}^7C_7$ $= 35 + 35 + 21 + 7 + 1$ $= 99$</p> <p>(b) (i) Bilangan cara / Number of ways $= {}^{10}P_{10}$ $= 3\,628\,800$</p> <p>(ii) $> 50 \rightarrow B, E, G, H$ $< 50 \rightarrow A, C, D, F, I, J$</p> <p>Bilangan cara / Number of ways $= {}^1P_1 \times {}^1P_1 \times {}^4P_3 \times {}^5P_5$ $= 1 \times 1 \times 24 \times 120$ $= 2\,880$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>8</p>
12	<p>(a) Konsonan / Consonant = C, R, D, K Vokal / Vowel = E, I</p> $P(\text{Konsonan} / \text{Consonant}) = \frac{4}{6}$ $= \frac{2}{3}$ <p>Jangkaan bilangan / Expected value $= (120)\left(\frac{2}{3}\right)$ $= 80$</p> <p>(b) Katakan / Let $X = \text{Konsonan} / \text{Consonant}$ $P(X > 2) = P(X = 3) + P(X = 4) + P(X = 5)$ $= {}^5C_3\left(\frac{2}{3}\right)^3\left(\frac{1}{3}\right)^2 + {}^5C_4\left(\frac{2}{3}\right)^4\left(\frac{1}{3}\right)^1 + {}^5C_5\left(\frac{2}{3}\right)^5\left(\frac{1}{3}\right)^0$ $= 0.3292 + 0.3292 + 0.1317$ $= 0.7901$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>6</p>

Bahagian B

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

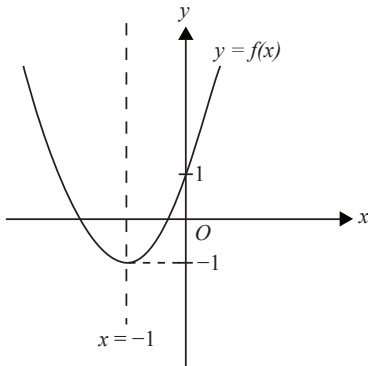
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks																
	$g(x) = [f^{-1}(x)]^2 + 1$ $= (x + 2)^2 + 1$ $= x^2 + 4x + 4 + 1$ $= x^2 + 4x + 5$ <p>(ii)</p> 	1																	
	<p>(c)</p> $f(x) = x - 2$ $f^2(x) = ff(x) = f(x - 2)$ $= (x - 2) - 2$ $= x - 4$ $f^3(x) = ff^2(x) = f(x - 4)$ $= (x - 4) - 2$ $= x - 6$ $f^4(x) = f^2f^2(x) = f^2(x - 4)$ $= (x - 4) - 4$ $= x - 8$ $f(x) = x - 2(1)$ $f^2(x) = x - 2(2)$ $f^3(x) = x - 2(3)$ $f^4(x) = x - 2(4)$ $f^n(x) = x - 2(n)$ $\therefore f^{75}(x) = x - 2(75)$ $f^{75}(x) = x - 150$	1																	
15	<p>(a)</p> $(x)(x) + (2x + 10)(x) > 8$ $x^2 + 2x^2 + 10x - 8 > 0$ $3x^2 + 10x - 8 > 0$ $(3x - 2)(x + 4) > 0$ <table border="1" data-bbox="264 1568 978 1754"> <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	8
	$x < -4$	$-4 < x < \frac{2}{3}$	$x > \frac{2}{3}$																
$3x - 2$	-	-	+																
$x + 4$	-	+	+																
$(3x - 2)(x + 4)$	⊕	-	⊕																

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

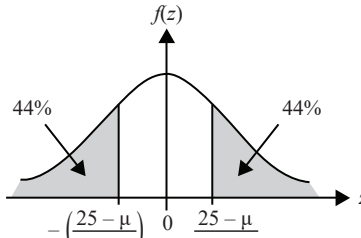
KERTAS 2

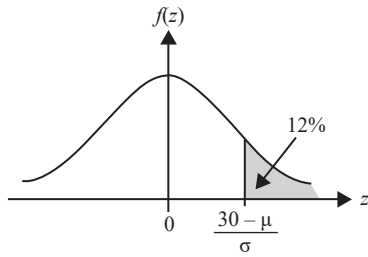
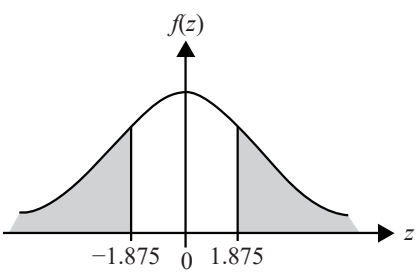
Bahagian A

No.	Skema Pemarkahan <i>Marking Scheme</i>	Markah <i>Marks</i>	Jumlah Markah <i>Total Marks</i>
1	<p>(a) (i) Luas / Area = $\frac{1}{2} r^2 \theta / \frac{1}{2} r^2 \theta$</p> $\frac{1}{2} (AC)^2 (2.8) = 113.4$ $(AC)^2 = \frac{113.4}{(2.8)\left(\frac{1}{2}\right)}$ $(AC)^2 = 81$ $AC = \sqrt{81}$ $AC = 9 \text{ cm}$ <p>(ii) $OA = \frac{1}{2} AC = 4.5 \text{ cm}$</p> $\therefore OC = 4.5 \text{ cm} + 9 \text{ cm}$ $= 13.5 \text{ cm}$ $\sin \theta = \frac{CP}{OC}$ $\sin \theta = \frac{7.74}{13.5}$ $\theta = \sin^{-1}\left(\frac{7.74}{13.5}\right)$ $\theta = 34.98^\circ$ $\theta = 0.6106 \text{ rad}$ $\theta = 0.611 \text{ rad}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	7
	<p>(b) $S_{CD} = (13.5)(0.611)$</p> $= 8.2485 \text{ cm}$ <p>$S_{BC} = (9)(2.8)$</p> $= 25.2 \text{ cm}$ <p>Perimeter = $AB + BC + CD + DO + OA$</p> $= 9 + 25.2 + 8.2485 + 13.5 + 4.5$ $= 60.4485 \text{ cm}$	<p>1</p> <p>1</p> <p>1</p>	
	2	<p>(a) $f(x) = 3x^2 + 3px + p$</p> $f(x) = 3\left(x^2 + px + \frac{p}{3}\right)$ $f(x) = 3\left[x^2 + px + \left(\frac{p}{2}\right)^2 - \left(\frac{p}{2}\right)^2 + \frac{p}{3}\right]$ $f(x) = 3\left[\left(x + \frac{p}{2}\right)^2 - \frac{p^2}{4} + \frac{p}{3}\right]$ $f(x) = 3\left(x + \frac{p}{2}\right)^2 - \frac{3p^2}{4} + p$	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	Nilai minimum / <i>Minimum value</i> = -1 $-\frac{3p^2}{4} + p = -1$ $-3p^2 + 4p = -4$ $-3p^2 + 4p + 4 = 0$ $3p^2 - 4p - 4 = 0$ $(3p + 2)(p - 2) = 0$ $3p + 2 = 0, p - 2 = 0$ $p = -\frac{2}{3}, p = 2$	1	
	(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 / <i>When</i> $f(x) = 0$; $3(x + 1)^2 - 1 = 0$ $(x + 1)^2 = \frac{1}{3}$ $x + 1 = \pm\sqrt{\frac{1}{3}}$ $x = -1 \pm\sqrt{\frac{1}{3}}$ Apabila / <i>When</i> $x = 0$; $f(x) = 3(0 + 1)^2 - 1$ $f(x) = 2$ Apabila / <i>When</i> , $x + 1 = 0$ $x = -1$ 	1	6

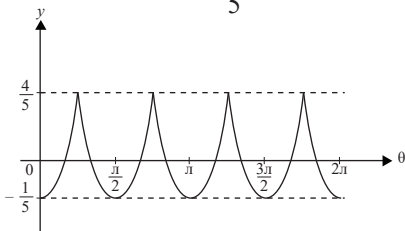
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>(b) (i) $\vec{CR} = 3(\underline{i} + 4\underline{j}) + \frac{12}{5}(5\underline{i})$ $\vec{CR} = 3\underline{i} + 12\underline{j} + 12\underline{i}$ $\vec{CR} = 15\underline{i} + 12\underline{j}$ $\vec{CR} = \sqrt{15^2 + 12^2}$ $\vec{CR} = 3\sqrt{41}$</p> <p>(ii) Luas / Area, $\Delta CAR = 3 \times \Delta CPQ$ $\frac{1}{2} \times CR \times \text{tinggi} / \text{height} = 3 \left(\frac{40}{3} \right)$ $\frac{1}{2} \times 3\sqrt{41} \times x = 40$ $3\sqrt{41} \times x = 80$ $x = \frac{80}{3\sqrt{41}}$ $x = \frac{80}{3\sqrt{41}} \times \frac{3\sqrt{41}}{3\sqrt{41}}$ $x = \frac{80\sqrt{41}}{123}$</p> <p>$\therefore$ Jarak terdekat / Shortest distance = 4.1646 unit</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>8</p>
5	<p>(a) $y = \int (4x - 6) dx$ $y = \frac{4x^2}{2} - 6x + c$ $y = 2x^2 - 6x + c$, melalui / pass through (1, 4) $4 = 2(1)^2 - (6)1 + c$ $4 = -4 + c$ $c = 4 + 4$ $c = 8$ $\therefore y = 2x^2 - 6x + 8$</p> <p>(b) $m_{\text{tangen/tangent}} : \frac{dy}{dx} = 4x - 6$ pada / at (1, 4) $\frac{dy}{dx} = 4(1) - 6$ $= -2$ $m_{\text{normal}} \times m_{\text{tangen/tangent}} = -1$ $m_{\text{normal}} \times -2 = -1$ $m_{\text{normal}} = \frac{1}{2}$ Persamaan normal melalui P(1, 4): Equation of normal passes through P(1, 4): $y - y_1 = m(x - x_1)$ $y - 4 = \frac{1}{2}(x - 1)$ $y = \frac{1}{2}x - \frac{1}{2} + 4$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	

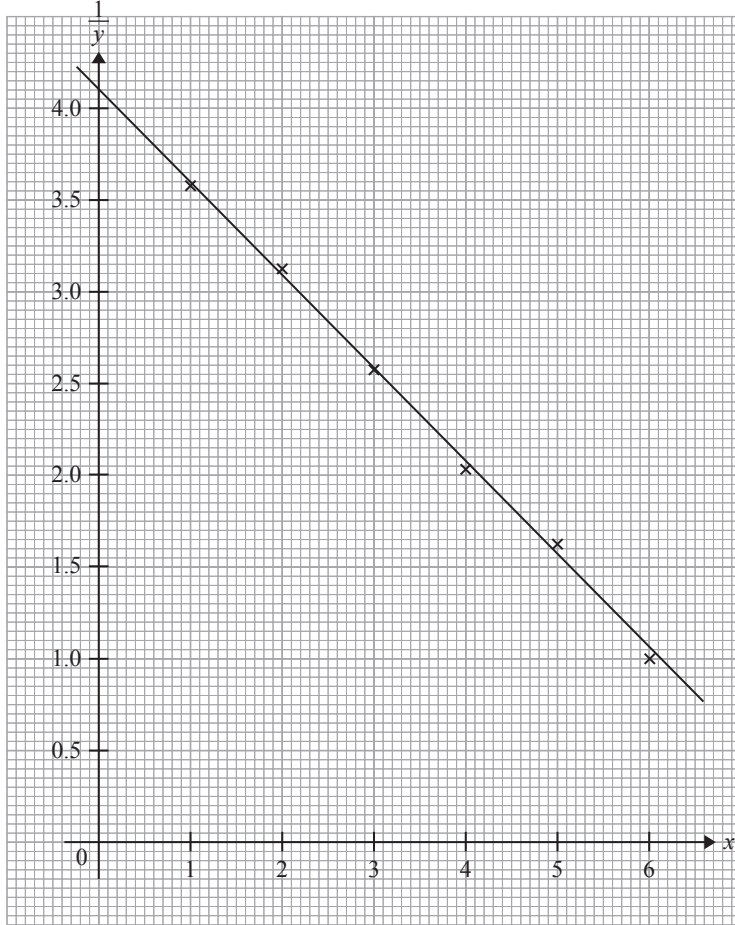
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	$y = \frac{1}{2}x + \frac{7}{2}$ $y = 2x^2 - 6x + 8 \dots \textcircled{1}$ $y = \frac{1}{2}x + \frac{7}{2} \dots \textcircled{2}$ $\textcircled{1} = \textcircled{2};$ $2x^2 - 6x + 8 = \frac{1}{2}x + \frac{7}{2}$ $2x^2 - 6x - \frac{1}{2}x + 8 - \frac{7}{2} = 0$ $2x^2 - \frac{13}{2}x + \frac{9}{2} = 0$ $4x^2 - 13x + 9 = 0$ $(4x - 9)(x - 1) = 0$ $4x - 9 = 0, x - 1 = 0$ $x = \frac{9}{4}, \quad x = 1 \text{ (abaikan / ignore)}$ <p>Dari / From $\textcircled{2}$,</p> $y = \frac{1}{2}x + \frac{7}{2}$ $y = \frac{1}{2} \left(\frac{9}{4} \right) + \frac{7}{2}$ $y = \frac{37}{8}$ $\therefore Q \left(\frac{9}{4}, \frac{37}{8} \right)$	<p>1</p> <p>1</p>	<p>7</p>
6	$P(x < 25) = 44\%$ $P \left(Z < \frac{25 - \mu}{\sigma} \right) = 0.44$ $\frac{25 - \mu}{\sigma} = -0.151$ $25 - \mu = -0.151\sigma \dots \textcircled{1}$ 	<p>1</p>	

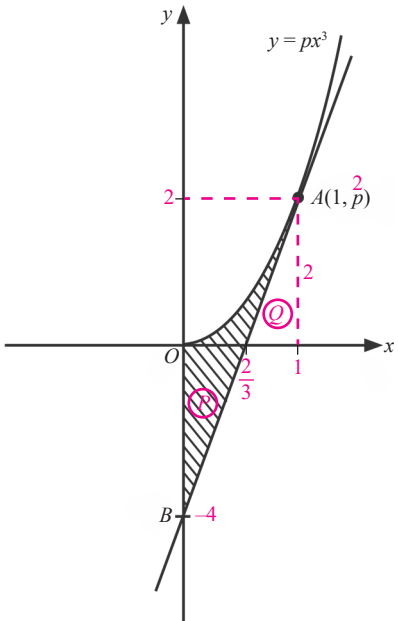
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	$P(x \geq 30) = 12\%$ $P\left(Z > \frac{30 - \mu}{\sigma}\right) = 0.12$ $\frac{30 - \mu}{\sigma} = 1.175$ $30 - \mu = 1.175\sigma \dots \textcircled{2}$  <p style="text-align: center;"> $f(z)$ z 0 $\frac{30 - \mu}{\sigma}$ </p> $\textcircled{2} - \textcircled{1};$ $(30 - \mu) - (25 - \mu) = 1.175\sigma - (-0.151\sigma)$ $30 - \mu - 25 + \mu = 1.175\sigma + 0.151\sigma$ $5 = 1.326\sigma$ $\frac{5}{1.326} = \sigma$ $\sigma = 3.7707$ <p>Dari / From $\textcircled{1}$,</p> $25 - \mu = -0.151\sigma$ $25 - \mu = -0.151(3.7707)$ $-\mu = -0.5694 - 25$ $-\mu = -25.5694$ $\mu = 25.5694$  <p style="text-align: center;"> $f(z)$ z -1.875 0 1.875 </p> $P(X < 18.5) = \frac{1}{n}$ $P\left(Z < \frac{18.5 - 25.57}{3.77}\right) = \frac{1}{n}$ $P(Z < -1.875) = \frac{1}{n}$ $0.0303 = \frac{1}{n}$ $n = \frac{1}{0.0303}$ $n = 33$	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p>	<p style="text-align: center;">6</p>

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

Bahagian B

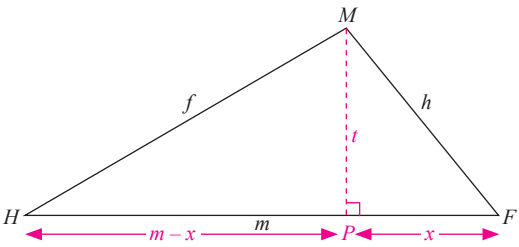
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
8	<p>(a) (i) $\cos/\cos 2\theta = \cos/\cos(\theta + \theta)$ $\cos/\cos 2\theta = \cos/\cos \theta \cos/\cos \theta - \sin \theta \sin \theta$ $\cos/\cos 2\theta = \cos^2/\cos^2 \theta - \sin^2 \theta$ (Terbukti / Proven)</p> <p>(ii) $3 \cos^2/\cos^2 \theta = 2 + 3 \sin^2 \theta$ $3 \cos^2/\cos^2 \theta - 3 \sin^2 \theta = 2$ $3(\cos^2/\cos^2 \theta - \sin^2 \theta) = 2$ $3 \cos/\cos 2\theta = 2$ $\cos/\cos 2\theta = \frac{2}{3}$ (I, IV)</p> <p>Sudut rujukan / Reference angle: $\cos^{-1}/\cos^{-1}\left(\frac{2}{3}\right) = 48.19^\circ$; $180^\circ \leq \theta \leq 360^\circ$, $360^\circ \leq 2\theta \leq 720^\circ$</p> <p>$2\theta = 48.19^\circ, 360^\circ - 48.19^\circ, 360^\circ + 48.19^\circ, 360^\circ + 311.81^\circ$ $= 48.19^\circ, 311.81^\circ, 408.19^\circ, 671.81^\circ$</p> <p>$\theta = 24.10^\circ, 155.91^\circ, 204.10^\circ, 335.91^\circ$ $\therefore \theta = 204.10^\circ, 335.91^\circ$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	
	<p>(b) (i) $y = - \cos^2/\cos^2 \theta - \sin^2 \theta + \frac{4}{5}$ $y = - \cos/\cos 2\theta + \frac{4}{5}, 0 \leq \theta \leq 2\pi$</p>  <p>(ii) $-\frac{1}{5} < h < \frac{4}{5}$</p>	<p>1</p> <p>3</p> <p>1</p>	<p>10</p>

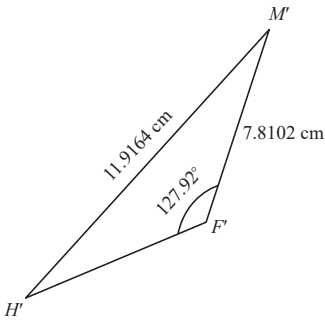
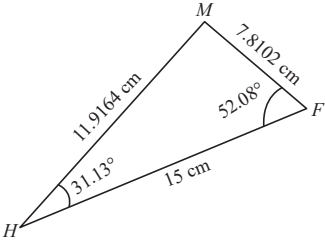
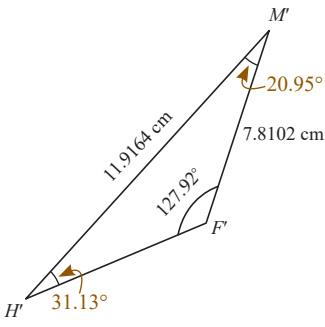
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks														
9	(a) <table border="1" data-bbox="235 186 963 294"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>$\frac{1}{y}$</td> <td>3.57</td> <td>3.13</td> <td>2.56</td> <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											
	(b) 	3															
	(c) (i) Apabila / When $x = 4.5$, $\frac{1}{y} = 1.825$ $y = \frac{1}{1.825}$ $y = 0.5479$ (ii) $\frac{y}{1} = \frac{a}{b-x}$ $\frac{1}{y} = \frac{b-x}{a}$ $\frac{1}{y} = -\frac{1}{a}x + \frac{b}{a}$ $Y = mX + C$	1 1 1															

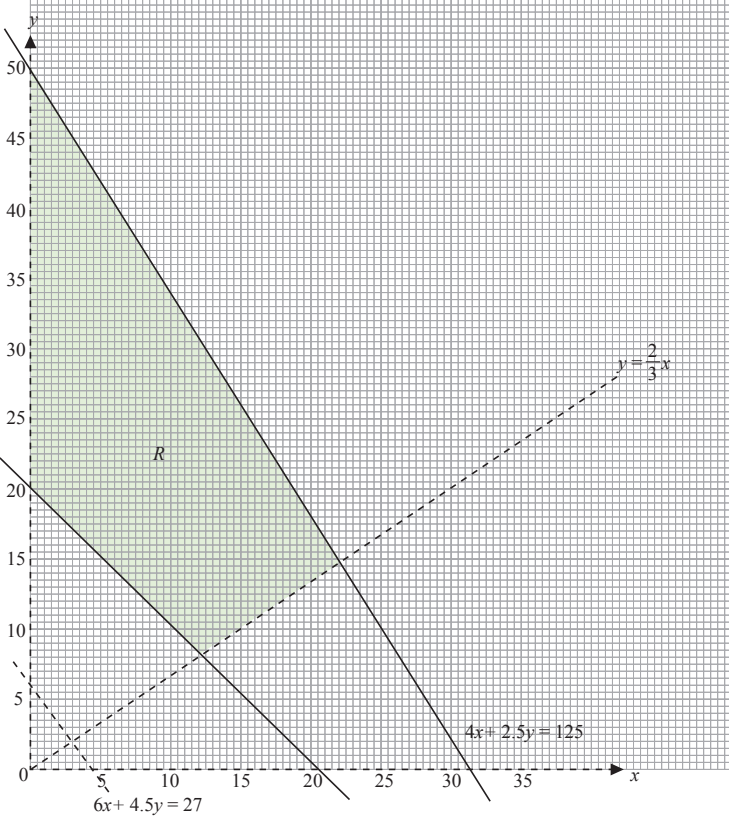
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	 <p data-bbox="185 833 485 940">Luas / Area, $\Delta P = \frac{1}{2} \times \frac{2}{3} \times 4$ $= \frac{4}{3}$</p> <p data-bbox="185 970 542 1087">Luas / Area, $\Delta Q = \frac{1}{2} \times \left(1 - \frac{2}{3}\right) \times 2$ $= \frac{1}{3}$</p> <p data-bbox="185 1117 728 1479">Luas lorekan / Shaded area $= \int_0^1 2x^3 dx - \frac{1}{3} + \frac{4}{3}$ $= \left[\frac{2x^4}{4}\right]_0^1 - \frac{1}{3} + \frac{4}{3}$ $= \left[\left(\frac{2(1)^4}{4}\right) - \left(\frac{2(0)^4}{4}\right) + 1\right]$ $= \left(\frac{1}{2} - 0\right) + 1$ $= \frac{1}{2} + 1$ $= \frac{3}{2}$</p>	<p data-bbox="1035 891 1049 921">1</p> <p data-bbox="1035 1127 1049 1156">1</p> <p data-bbox="1035 1440 1049 1470">1</p>	

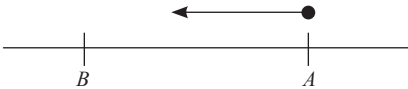
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	Dari / From ①, $2y = 9 + x$ $2y = 9 + 5$ $2y = 14$ $y = 7$ $\therefore R(5, 7)$	1	10
(c) (i)	Luas / Area, ΔPQR $= \frac{1}{2} \begin{vmatrix} 1 & -1 & 5 & 1 \\ 1 & 4 & 7 & 1 \end{vmatrix}$ $= \frac{1}{2} [(1)(4) + (-1)(7) + (5)(1)] - [(1)(-1) + (4)(5) + (7)(1)]$ $= \frac{1}{2} 2 - 26 $ $= \frac{1}{2} -24 $ $= \frac{1}{2}(24)$ $= 12 \text{ unit}^2$	1	
(ii)	$RU = \frac{5}{2}QU$	1	
	$\sqrt{(x-5)^2 + (y-7)^2} = \frac{5}{2}\sqrt{[(x-(-1))]^2 + (y-4)^2}$	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	

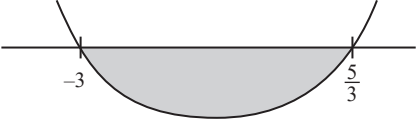
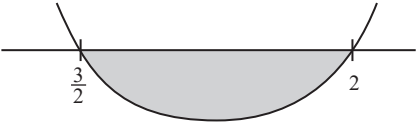
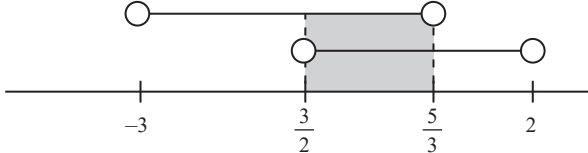
Bahagian C

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
12	(a)  <p> $PF = x, PH = m - x, MP = t$ Dengan Teorem Pythagoras / By Pythagoras Theorem, $f^2 = t^2 + (m - x)^2$ $f^2 = t^2 + m^2 - 2mx + x^2 \dots \textcircled{1}$ </p>	1	

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

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
13	(a) $4x + 2.5y \leq 125$	1	
	(b) $y = \frac{20-0}{0-20}x + 20$ $y = -x + 20$ $y \geq 20 - x$	1	
	(c) $x < \frac{3}{2}y$ $y > \frac{2}{3}x$	1	
		2	
	<p>(d) (i) 17 bungkus / packets</p> <p>(ii) Untung / Profit, $P = (10 - 4)x + (7 - 2.5)y$ $= 6x + 4.5y$</p> <p>Katakan / Let $6x + 4.5y = 27$ Titik optimum / Optimal point: (0, 50)</p> <p>$P = 6(0) + 4.5(50)$ $= \text{RM}225$</p> <p>Simpanan / Saving = $50\% \times \text{RM}225$ $= \text{RM}112.50$</p>	1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>Baki / Remaining = RM112.50 – RM40 = RM72.50</p> <p>∴ Ya, harga jualan adalah sesuai kerana Mus boleh menyimpan duit dan membayar upah pekerja dan masih mempunyai baki sebanyak RM72.50 untuk modal seterusnya. <i>Yes, the selling price is suitable because he is able to save money and for the wages and still have a balance of RM72.50 for his capital rolling.</i></p>	<p>1</p> <p>1</p>	<p>10</p>
<p>14</p>	<p>(a) Apabila / When $t = 0$, $v = 3(0)^2 + 4(0) - 15$ $v = -15 \text{ m s}^{-1}$ (zarah bergerak ke kiri / <i>particle is moving to the left</i>)</p>  <p>∴ Titik A berada di kanan titik B. / <i>Point A is to the right of point B.</i></p> <p>(b) $a = \frac{dv}{dt}$ $a = 6t + 4$; apabila / when $t = 1.3 \text{ s}$ $a = 6(1.3) + 4$ $a = 11.8 \text{ m s}^{-2}$</p> <p>(c) Maksimum / Maximum, s; $v = 0 \Rightarrow 3t^2 + 4t - 15 = 0$ $(3t - 5)(t + 3) = 0$ $3t - 5 = 0, t + 3 = 0$ $t = \frac{5}{3}, t = -3$ (abaikan/ignore)</p> <p>$s = \int (3t^2 + 4t - 15) dt$ $s = \frac{3t^3}{3} + \frac{4t^2}{2} - 15t + c$ $s = t^3 + 2t^2 - 15t + c$</p> <p>Apabila / when $t = 0$, $s = 0$; $0 = (0)^3 + 2(0)^2 - 15(0) + c$ $0 = c$ ∴ $s = t^3 + 2t^2 - 15t$</p> <p>Apabila / when $t = \frac{5}{3}$; $s = \left(\frac{5}{3}\right)^3 + 2\left(\frac{5}{3}\right)^2 - 15\left(\frac{5}{3}\right)$ $s = -14\frac{22}{27} \text{ m}$</p> <p>∴ Zarah P tidak akan melalui titik B kerana ia hanya boleh bergerak dengan jarak maksimum sejauh $14\frac{22}{27} \text{ m}$ dari titik A, sedangkan titik B berada sejauh 15 m dari titik A. <i>Particle P will not pass through point B because it can only travel a maximum distance of $14\frac{22}{27} \text{ m}$ from point A, whereas point B is 15 m away from A.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Jumlah Markah Total Marks
	<p>(d) Zarah bergerak ke kiri / Particles move to the left, $v < 0$</p> $v_p < 0$ $3t^2 + 4t - 15 < 0$ $(3t - 5)(t + 3) < 0$  $3 < t < \frac{5}{3}$ $v_q < 0$ $2t^2 - 7t + 6 < 0$ $(2t - 3)(t - 2) < 0$  $\frac{3}{2} < t < 2$  <p>Kedua-dua zarah bergerak ke kiri apabila $\frac{3}{2} < t < \frac{5}{3}$.</p> <p>Both particles were move to the left when $\frac{3}{2} < t < \frac{5}{3}$.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>10</p>
15	<p>(a) $\bar{I}_{22} = 130$</p> $\frac{2.10}{x} \times 100 = 130$ $\frac{2.10}{x} = \frac{130}{100}$ $x = \frac{2.10 \times 100}{130}$ $x = 1.62$ $y = \frac{2.40}{2.00} \times 100$ $y = 120$	<p>1</p> <p>1</p>	

No.	Skema Pemarkahan <i>Marking Scheme</i>	Markah <i>Marks</i>	Jumlah Markah <i>Total Marks</i>
	$\bar{I}_{25/23} = 100 + 20.25$ $\frac{P_{2025}}{P_{2023}} \times 100 = 120.25$ $\frac{P_{2025}}{\text{RM}33.75} \times 100 = 120.25$ $P_{2025} = \frac{120.25 \times \text{RM}33.75}{100}$ $P_{2025} = \text{RM}40.58$ <p>Bilangan kotak / <i>Number of box</i> = $200 \div 40$ = 5</p> <p>Harga kotak / <i>Price of box</i> = $5 \times \text{RM}1.50$ = $\text{RM}7.50$</p> <p>Jumlah kos pada tahun 2025 / <i>Total cost in the year 2025</i> = $\text{RM}40.58 + \text{RM}7.50$ = $\text{RM}48.08$</p> <p>$\text{RM}48.08 > \text{RM}45$ ∴ Duit yang diperuntukkan adalah tidak mencukupi. <i>The allocated money is not enough.</i></p>	<p>1</p> <p>1</p> <p>1</p>	<p>10</p>