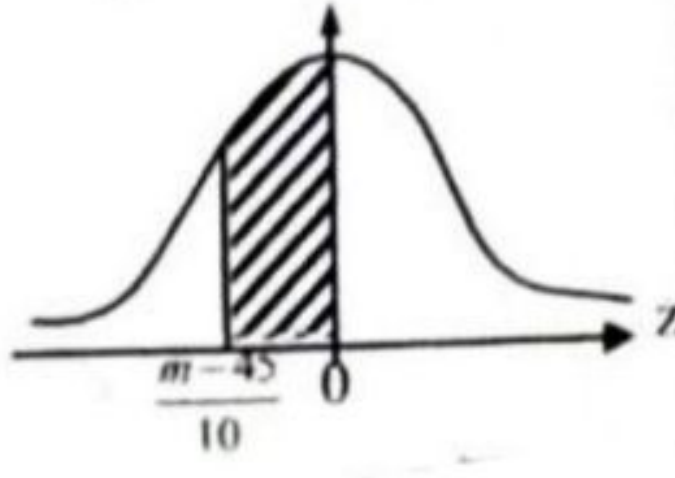


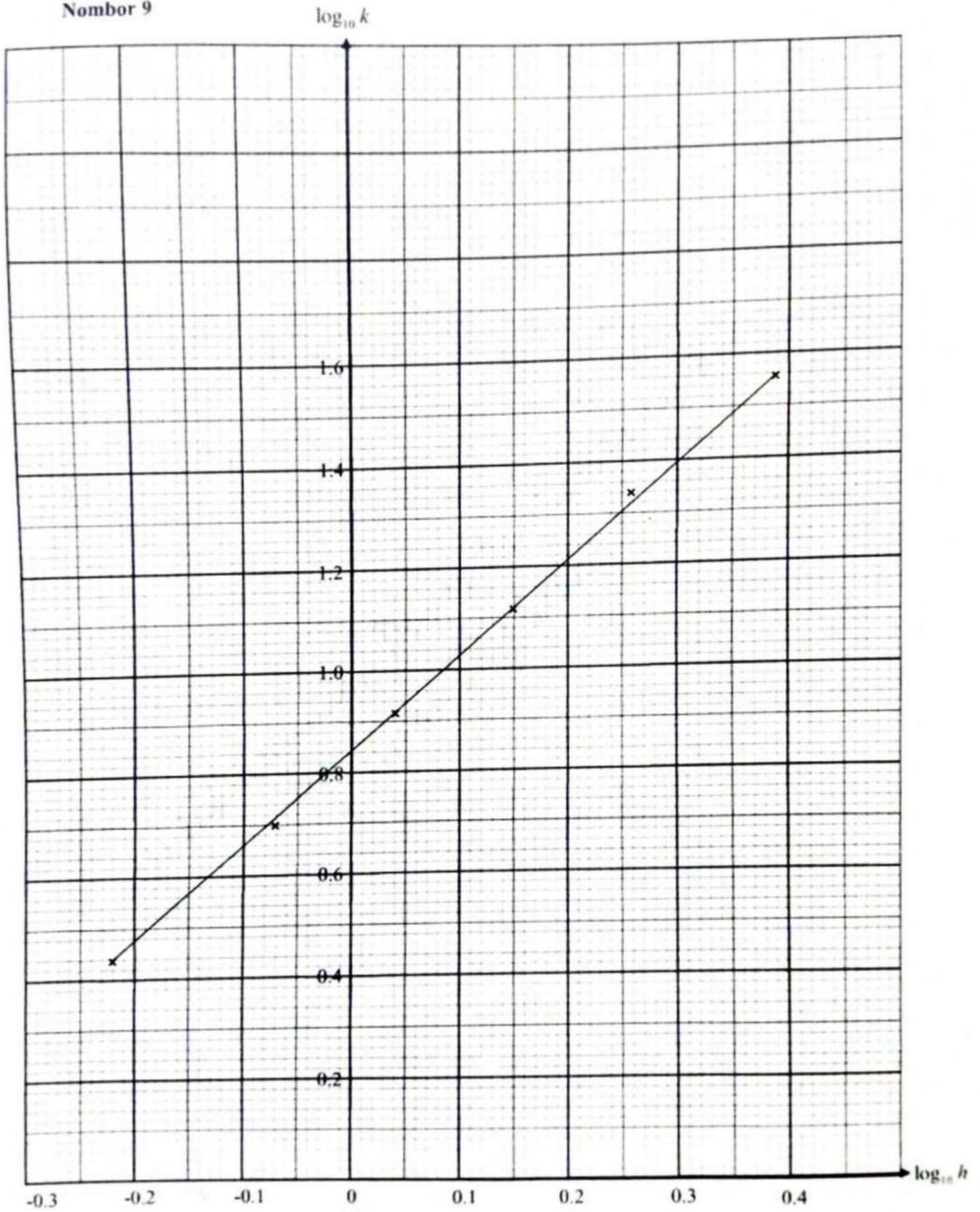
No.	Skema Pemarkahan	Sub Markah	Total Markah
1	$\frac{100}{x} + \frac{100}{y} = 2.5$ $x = 20 + y$ $40y + 40(20 + y) = y(20 + y)$ $y = \frac{-(-60) \pm \sqrt{(-60)^2 - 4(1)(-800)}}{2}$ $y = 71.23, y = -11.23$ $x = 91.23, x = +8.77$ $\text{Masa} = 1.10 \text{ saat}$	P1 K1 K1 K1 N1 N1 N1	7
2(a)(i)	$f(3) = \ln(4(3) - 2)$ 2.303	K1 N1	7
(ii)	$\ln(4x - 2) > 5$ $4x - 2 > e^5$ $x > 37.60$	K1 N1	
(b)	$(m^{\frac{1}{3}})^2 - 2(m^{\frac{1}{3}}) - 15 = 0 \quad \text{or} \quad \text{let } m^{\frac{1}{3}} = x, x = 2 + \frac{15}{x}$ $(m^{\frac{1}{3}} - 5)(m^{\frac{1}{3}} + 3) = 0 \quad \text{or} \quad (x - 5)(x + 3) = 0$ $m^{\frac{1}{3}} = 5 \text{ atau } m^{\frac{1}{3}} = -3$ $m = 125, m = -27$	K1 K1 N1	
3(a)(i)	$(x - \alpha)(x - \beta) = 0 \text{ dan}$ $x^2 - (\alpha + \beta)x + \alpha\beta = 0 \text{ atau } x^2 + \left(\frac{b}{a}\right)x + \frac{c}{a} = 0$ $\text{Guna } \alpha + \beta = -\frac{b}{a} \text{ dan } \alpha\beta = \frac{c}{a}$	K1 N1	7
(ii)	$\text{SOR} = \frac{15}{2}, \text{POR} = -3$	N1N1	
(b)	$4x^2 - 6x - 23 = 0$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(4)(-23)}}{2(4)}$ $\frac{3 \pm \sqrt{101}}{4}$	K1 K1 N1	

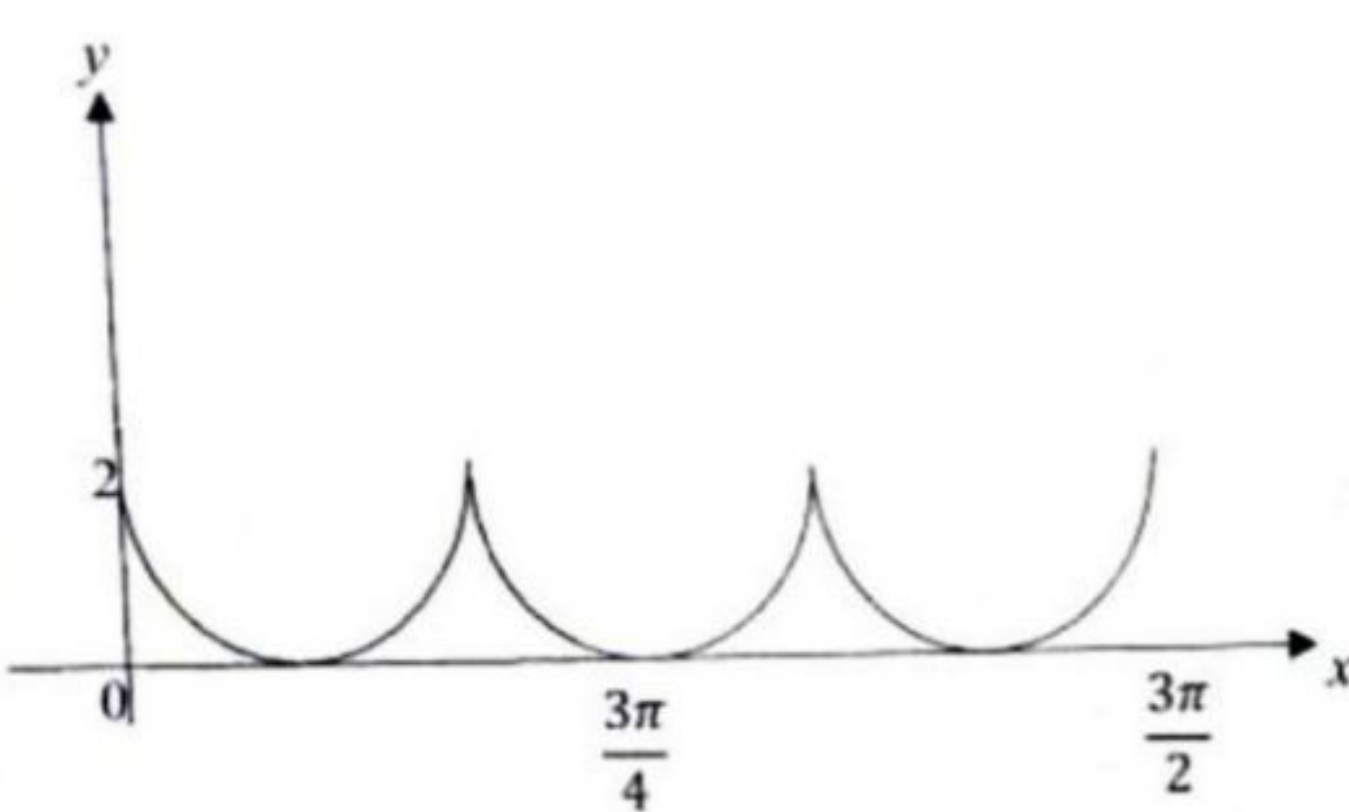
No.	Skema Pemarkahan	Sub Markah	Total Markah
4(a)	$\frac{dy}{dx} = 3x^2 - 12 \quad m = 15$ $y + 9 = 15(x - 3)$ $y = 15x - 54$	K1 K1 N1 P1	7
(b)	$P = y^2 - 12y + 16$ atau setara $\frac{dP}{dy} = 2y - 12$ $P = (6)^2 - 12(6) + 16$ -20	K1 K1 N1	
5(a)	$8\left(\frac{\pi}{3}\right)$ atau $8\left(60^\circ \times \frac{\pi}{180^\circ}\right)$ $8 + 4\left[8\left(\frac{\pi}{3}\right)\right] + 8$ atau $8 + 4\left[8\left(60^\circ \times \frac{\pi}{180^\circ}\right)\right] + 8$ $49.50 - 49.51 \text{ cm}$	K1 K1 N1	7
(b)	$\frac{1}{2}(8)^2\left(\frac{\pi}{3}\right)$ atau $\frac{1}{2}(8)^2(1.047)$ $\frac{1}{2}(8)(8)\sin 60^\circ$ $4\left(\frac{1}{2}(8)^2\left(\frac{\pi}{3}\right) - \frac{1}{2}(8)(8)\sin 60^\circ\right)$ $23.20 - 23.21 \text{ cm}^2$	K1 K1 K1 N1	
6(a)	$d_1 = \log y - \log x$ dan $d_2 = \log z - \log y$ $x = \frac{y^2}{z}$, $\log y - \log \frac{y^2}{z} = \log z - \log y$ atau setara $d_1 = d_2$	K1 N1	7
(b)(i)	$T_{10} = 1(2)^9$ 512	K1 N1	
(ii)	$\frac{1(2^n - 1)}{2 - 1} = 16383$ $n \log_{10} 2 = \log_{10} 16384$ 14	K1 N1	

No.	Skema Pemarkahan	Sub Markah	Total Markah
7	$P\left(Z > \frac{70-45}{10}\right)$ atau $P\left(Z > \frac{39-45}{10}\right)$ (a) 0.00621 (b) 190×0.2743 52 orang murid (c) $P\left(\frac{m-45}{10} < Z < \frac{45-45}{10}\right)$ $P\left(Z < \frac{45-45}{10}\right) - P\left(Z < \frac{m-45}{10}\right)$ atau  $\frac{m-45}{10} = -1.036 // -1.037$ 34.63 // 34.64	K1 N1 K1 N1 K1 K1 K1 N1	8
8(a)(i)	$\overline{AC} = \overline{AO} + \overline{OC}$ atau $\overline{OD} = \overline{OA} + \overline{AD}$	PI K1	10
(ii)	$\overline{AC} = -\underline{x} + \frac{3}{5}\underline{y}$ $\overline{OD} = -\underline{x} + \frac{2}{3}\left(-\underline{x} + \underline{y}\right)$ $\overline{OD} = \frac{1}{3}\underline{x} + \frac{2}{3}\underline{y}$	N1 K1 N1	
(b)(i)	$\overline{OE} = \frac{1}{3}h\underline{x} + \frac{2}{3}h\underline{y}$	N1	
(ii)	$\overline{OE} = -\underline{x} + k\left(-\underline{x} + \frac{3}{5}\underline{y}\right)$ $\overline{OE} = (1-k)\underline{x} + \frac{3}{5}k\underline{y}$	K1 N1	
(c)	$\frac{1}{3}h\underline{x} + \frac{2}{3}h\underline{y} = (1-k)\underline{x} + \frac{3}{5}k\underline{y}$ $\frac{1}{3}h = 1-k$ atau $\frac{2}{3}h = \frac{3}{5}k$ Samakan pekali $\underline{x}$ atau $\underline{y}$ ——— 101 $h = \frac{9}{13}, k = \frac{10}{13}$	K1 K1 N1N1	

No.	Skema Pemarkahan	Sub Markah	Total Markah														
9(a)	<table><tr><td>$\log_{10} h$</td><td>-0.22</td><td>-0.07</td><td>0.04</td><td>0.15</td><td>0.26</td><td>0.39</td></tr><tr><td>$\log_{10} k$</td><td>0.44</td><td>0.70</td><td>0.92</td><td>1.12</td><td>1.34</td><td>1.56</td></tr></table> Plot $\log_{10} k$ melawan $\log_{10} h$ dengan paksi betul dan skala seragam (sekurang-kurangnya satu titik diplot betul, skala seragam dan graf garis lurus) Semua titik di plot betul Garis penyuaian terbaik	$\log_{10} h$	-0.22	-0.07	0.04	0.15	0.26	0.39	$\log_{10} k$	0.44	0.70	0.92	1.12	1.34	1.56	N1 N1 K1 K1 N1 P1 K1 N1 K1 N1	10
$\log_{10} h$	-0.22	-0.07	0.04	0.15	0.26	0.39											
$\log_{10} k$	0.44	0.70	0.92	1.12	1.34	1.56											
(b)(i)	$\log_{10} k = \frac{p}{2} \log_{10} h - \log_{10} q$ $\frac{p}{2} = \frac{1.56 - 0.44}{0.39 - (-0.22)}$ $p = 3.672$																
(ii)	$-\log_{10} q = 0.84$ $q = 0.1445$																
10 (a)	$A(0,1)$	P1	10														
(b)	$\frac{1}{4} \left[\frac{y^3}{3} - y \right]_1^3 \text{ atau } \frac{1}{4} \left[\frac{y^3}{3} - y \right]_1^3$ $2(3) - \int_0^2 f(x) dx$ $\left \frac{1}{4} \left[\frac{y^3}{3} - y \right]_{-1}^1 \right + (6-m) - \frac{1}{4} \left[\frac{y^3}{3} - y \right]_1^3$ $\left \frac{1}{4} \left(\left(\frac{1^3}{3} - 1 \right) - \left(\frac{(-1)^3}{3} - (-1) \right) \right) \right + (6-m) - \left(\frac{1}{4} \left(\left(\frac{3^3}{3} - 3 \right) - \left(\frac{(1)^3}{3} - 1 \right) \right) \right)$ $\frac{14}{3} - m$	K1 K1 K1 K1 N1															
(c)	$\int_0^2 \frac{1}{4} \pi (x^4 + 4x^2 + 4) dx$ $\frac{1}{4} \pi \left[\frac{x^5}{5} + \frac{4x^3}{3} + 4x \right]_0^2$ $\frac{1}{4} \pi \left[\left(\frac{2^5}{5} + \frac{4(2)^3}{3} + 4(2) \right) - (0) \right]$ $\frac{22}{3} \pi \text{ unit}^3$	K1 K1 K1 N1															

Nombor 9



No.	Skema Pemarkahan	Sub Markah	Total Markah
11(a)		K1	10
(i)	$\frac{2 \tan \theta}{1 - \tan^2 \theta}$ $\tan 2\theta$	N1 K1	
(ii)	$\tan 2\theta = \frac{\sqrt{3}}{2}$ $\angle Rujukan = 40.89^\circ$ $\theta = 20.45^\circ, 110.45^\circ, 200.45^\circ$	N1 N1	
(b)	 Bentuk graf sinus $1\frac{1}{2}$ kitaran Amplitud = 2 Mutlak dan anjakan 2 unit ke atas $0 < k < 2$	P1 P1 P1 P1 N1	

No.	Skema Pemarkahan	Sub Markah	Total Markah
12(a)	$AC^2 = 12.5^2 + 8.4^2 - 2(12.5)(8.4)\cos 64^\circ$ (i) 11.61 cm (ii) $\frac{\sin \angle ACD}{6} = \frac{\sin 116^\circ}{11.61}$ $\angle ACD = 27.68^\circ$ $\angle CAD = 180^\circ - 116^\circ - 27.68^\circ$ $\angle CAD = 36.32^\circ$	K1 N1 K1 N1 K1 N1	
(b)(i)	$\frac{1}{2}(6)(11.608)\sin 36.32^\circ$ 20.63 cm ² (ii) $\frac{1}{2}(11.61)(h) = 20.63$ 3.554 cm	K1 N1 K1 N1	
13(a)	$\frac{Q_{2021}}{15.50} \times 100 = 120 \quad \text{atau} \quad \frac{18.00}{Q_{2019}} \times 100 = 125$ (i) $Q_{2021} = \text{RM}18.60$ (ii) $Q_{2019} = \text{RM}14.40$ (b) $\frac{120(2) + 3x + 130(4) + 125(1)}{2 + 3 + 4 + 1} = 135$ $x = 155$ (c) 138 atau 123.5 atau 135 $\bar{I} = \frac{138(2) + 3(155) + 123.5(4) + 135(1)}{2 + 3 + 4 + 1}$ $\bar{I} = 137$ (d) $\frac{Q_{2022}}{45.30} \times 100 = 137$ $Q_{2022} = \text{RM}62.06$	K1 N1 N1 K1 N1 P1 K1 N1 K1 N1	10

SULIT

No.	Skema Pemarkahan	Sub Markah	Total Markah
14(a)	$y < 4x$	N1	10
	$40x + 20y \leq 1800$	N1	
	$30x + 60y \geq 1500$	N1	
	(b) Satu garis lurus dilukis dengan betul	K1	
	Ketiga-tiga garis lurus dilukis dengan betul	K1	
	Rantau dilorek dengan betul	N1	
	(c)(i) 59	N1	
	(ii) Titik Minimum (6,22)	N1	
	$14(6) + 19.25(22)$	K1	
	507.5	N1	
15(a)	$\frac{dv}{dt} = 2qt$ dan $2q(2) = -4$	K1	10
	$q = -1$	N1	
	$s = pt + (-1)\frac{t^3}{3}$	K1	
	$6p + (-1)\frac{(6)^3}{3} = -48$	K1	
	$p = 4$	N1	
	(b) $4 + (-1)t^2 = 0$	K1	
	$t = 2$	N1	
	(c) $4t - \frac{t^3}{3}$	K1	
	$\left[4(5) - \frac{5^3}{3}\right] - \left[4(4) - \frac{4^3}{3}\right]$	K1	
	$16\frac{1}{3}$	N1	

SULIT

Nombor 14

