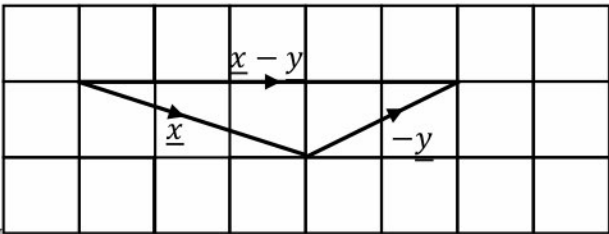
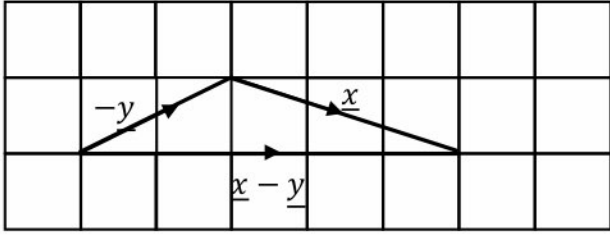
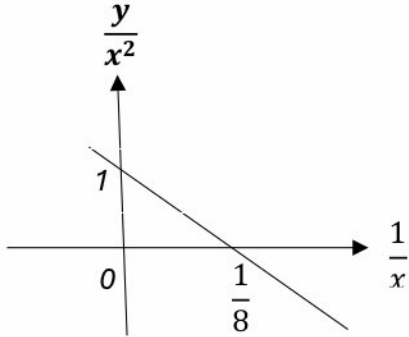


Bil	Skema Pemarkahan		Sub Markah
1	(a)	$(5,0) = \left(\frac{3(2) + 3(x)}{3+2}, \frac{4(2) + 3(y)}{3+2} \right)$ $5 = \frac{3(2)+3(x)}{3+2} @ 0 = \frac{4(2)+3(y)}{3+2}$ $5(5) - 6 = 3x, -8 = 3y$ $Q = \left(\frac{19}{3}, \frac{-8}{3} \right)$	K1 N1
	(b)	$\frac{TP}{TS} = \frac{1}{2}$ $2TP = TS$ $2\sqrt{(x - (-4))^2 + (y - (-3))^2} @ \sqrt{(x - 5)^2 + (y - 0)^2}$ $2\sqrt{(x - (-4))^2 + (y - (-3))^2} = \sqrt{(x - 5)^2 + (y - 0)^2}$ $4(x^2 + 8x + 16 + y^2 + 6y + 9) = x^2 - 10x + 25 + y^2$ $3x^2 + 3y^2 + 42x + 24y + 75 = 0$ $x^2 + y^2 + 14x + 8y + 25 = 0$	K1 K1 N1
2	(a)	Kuantiti skalar kerana mempunyai magnitud sahaja Terima: Magnitud tanpa arah	P1
	(b)	Melukis vektor-vektor $\underline{x}$, $-\underline{y}$ dan $\underline{x} - \underline{y}$ dengan setiap vektor dilabel, simbol vektor dan arah anak panah vektor Arah vektor ke timur/ ke kanan Terima: Vektor $\underline{x}$ dan $-\underline{y}$ dilukis garisan putus-putus dan garis lurus untuk paduan vektor $\underline{x} - \underline{y}$  ATAU 	P2 N1

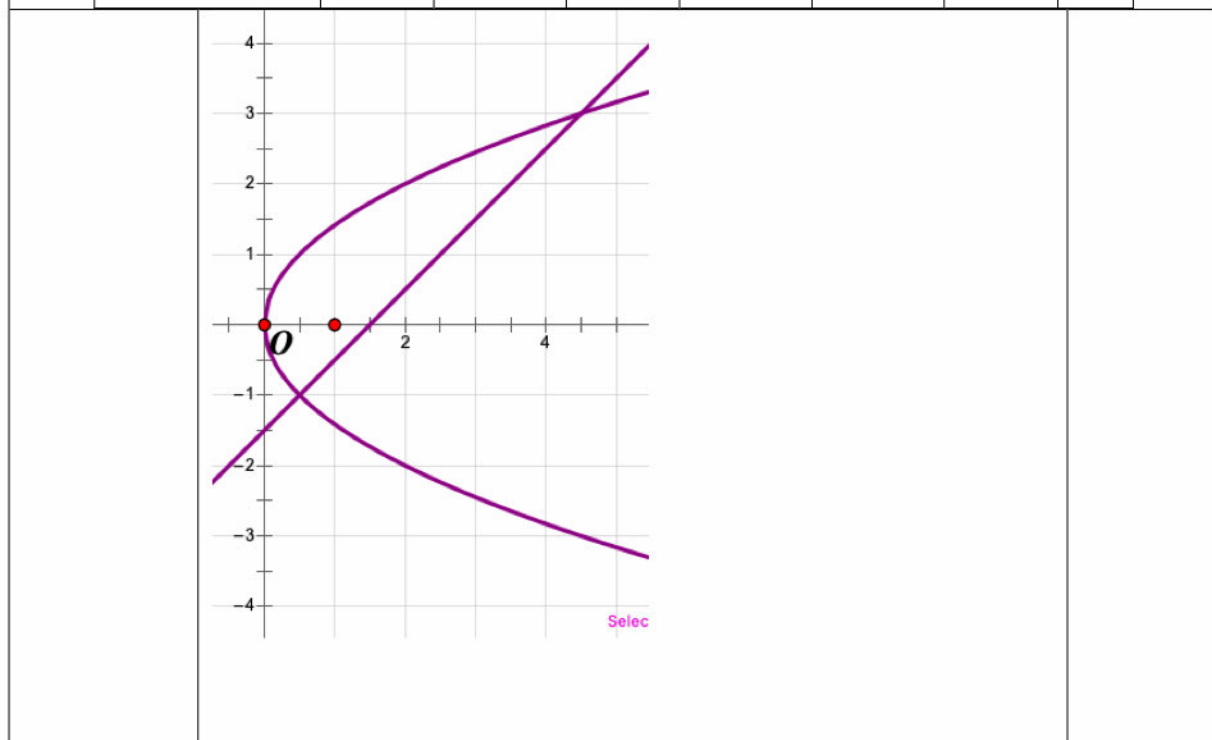
		Beri P1: Melukis cantuman vektor-vektor $\underline{x}$ dan $-\underline{y}$ dengan betul, berlabel dan simbol tapi tiada paduan vektor atau hanya melukis paduan vektor akhir $\underline{x} - \underline{y}$ dengan betul lengkap berlabel, simbol dan arah vektor tapi tidak kelihatan cantuman vektor-vektor $\underline{x}$ dan $-\underline{y}$ atau melukis vektor-vektor $\underline{x}$ dan $-\underline{y}$ dan paduan vektor $\underline{x} - \underline{y}$ dengan arah vektor yang betul tapi tiada label dan tanpa simbol vektor Beri P0: tidak melukis arah vektor atau salah arah	
	(c)	$\sqrt{(6)^2 + (-3)^2}$ Terima: $\sqrt{6^2 + (-3)^2}$ Beri K0 N0: -3^2 (tiada sepasang tanda kurungan) $\frac{2\sqrt{5}i}{5} - \frac{\sqrt{5}j}{5}$	K1 N1
3	(a)	$\frac{2n+2}{n-1} = \frac{7n+1}{2n+2}$ $(3n+1)(n-5) = 0 \text{ DAN } n = -\frac{1}{3}, n = 5$ (mesti tunjuk pemfaktoran & 2 nilai n) $n = 5$ $T_1 = a = 4 \text{ cm}$	K1 N1 N1
	(b)	$a = 0.036 @ r = \frac{0.00036}{0.036} @ S_{\infty} \frac{0.036}{1-0.01}$ $2.5 + \frac{0.036}{1-0.01}$ $\frac{279}{110}$	K1 N1
4	(a)	$\frac{y}{x} = x - 8$ Kecerunan = 1 Pintasan $-X = 8$	P1 N1 N1
	(b)	 -Pintasan $-Y$ dan asalan mesti label	P1



5	$3x^2 + 2x - 6 = 0$	K1
	$p + q = -\frac{2}{3} \quad \text{dan} \quad pq = -2$	K1
	$= 3$	
	HTP baru :	
	$\frac{p}{q} + \frac{q}{p} = \frac{p^2 + q^2}{pq} = \frac{(p + q)^2 - 2pq}{pq}$ $= \frac{\left(-\frac{2}{3}\right)^2 - 2(-2)}{(-2)}$ $= -\frac{20}{9}$	K1 K1
	HDP baru :	
	$\frac{p}{q} \times \frac{q}{p} = 1$	K1
	Persamaan baru :	
	$x^2 - \frac{-20}{9}x + 1 = 0$	
	$9x^2 + 20x + 9 = 0 \quad \text{atau setara}$	N1

6		
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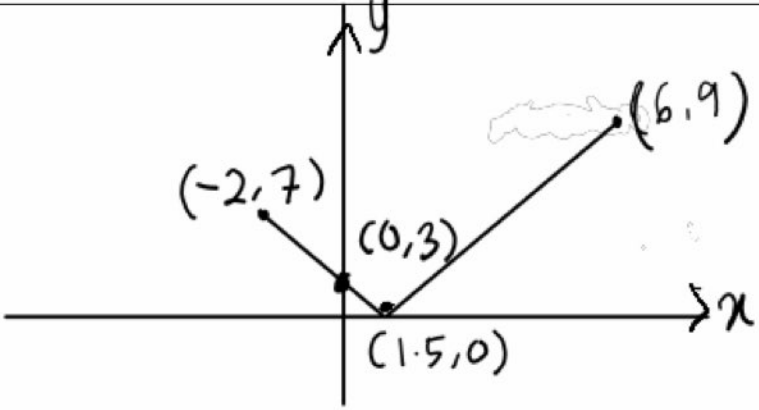
x	0	1	2	3	4	5	
$2y - 2x = -3$	-1.5	-0.5	0.5	1.5	2.5	3.5	N1
$y^2 - 2x = 0$	0	± 1.41	± 2	± 2.45	± 2.83	± 3.16	N1



	Lukis graf garis Plot sekurang-kurangnya 3 mana-mana titik dengan betul Graf lengkung melalui semua titik dengan betul Tidak melabel asalan dengan 0 – N0 (0.5, –1) dan (4.5, 3)	N1 K1 N1 N1
7	i) -Lukiskan satu lengkok AB yang panjangnya sama dengan jejari bulatan dalam rajah yang diberi. -Labelkan sudut pusat $\angle AOB$. -Nyatakan nilai sudut $\angle AOB$ dalam radian. Panjang lengkok = Jejari $s = r$ Menggunakan rumus: $s = r\theta$ $r = r\theta$ $\theta = 1$ Sudut $\angle AOB = 1$ rad b i) Rumus panjang lengkok: $s = r\theta$ $s = (x + 4)(2)$ $s = 2x + 8$ b ii) $s = 2x + 8$ Diberi: $s = 28$ $2x + 8 = 28$ $2x = 20$ $x = 10$	N1 K1 N1 K1 N1
8	$y = 5x - x^2$(1) $y + \delta y = 5(x + \delta x) - (x + \delta x)^2$ $y + \delta y = 5x + 5\delta x - x^2 - 2x\delta x - (\delta x)^2$(2) (2) – (1) $\delta y = 5\delta x - 2x\delta x - (\delta x)^2$ $\frac{\delta y}{\delta x} = 5 - 2x - \delta x$ $\frac{dy}{dx} = \lim_{\delta x \rightarrow 0} 5 - 2x - \delta x$ $\frac{dy}{dx} = 5 - 2x - 0$ $\frac{dy}{dx} = 5 - 2x$	K1 K1 K1 N1

9	(a)(i)	$2 + \left \int_h^k f(y) dy \right + 2 = 6$ $\int_h^k f(y) dy = -2$ $\int_0^k f(y) dy = 0$	K1
	(a)(ii)	$-2 + \frac{3}{2}(2)$	K1
		1	N1
10	(a)	$3^p + 3^p(3^1) + 3^p(3^2)$ dan $3^p(1 + 3 + 9)$ $3^p(13)$ ya, kerana $3^p(13)$ boleh dibahagi tepat oleh 13 bagi semua integer positif p.	K1 N1 N1
	(b)	$\frac{1}{2} \times t \times (3 + \sqrt{2}) = 7 + 7\sqrt{2}$ $= \frac{7 + 7\sqrt{2}}{3 + \sqrt{2}} \times \frac{3 - \sqrt{2}}{3 - \sqrt{2}}$ $= \frac{21 - 7\sqrt{2} + 21\sqrt{2} - 14}{9 - 2}$ $= \frac{7 + 14\sqrt{2}}{7}$ $= 1 + 2\sqrt{2}$	K1 K1 K1 N1
11	(a)	Diskret	P1
	(b)	$P\left(Z < \frac{1.5 - \mu}{\sigma}\right) = 0.0228$ atau $P\left(Z > \frac{3.5 - \mu}{\sigma}\right) = 0.2523$ Nampak -2.0 atau 0.667 Selesaikan persamaan serentak $2.667\sigma = 2$ $\sigma = 0.7499$ $\mu = 2.9998$	K1 K1 K1 N1 N1
12	(a) (i)	120	N1
	(ii)	$\frac{4!}{2!} \times \frac{4!}{3!}$ 48	K1 N1
	(b) (i)	15	N1
	(ii)	$({}^5C_1 \times {}^6C_6) @ ({}^5C_2 \times {}^6C_5)$ 65	K1 N1

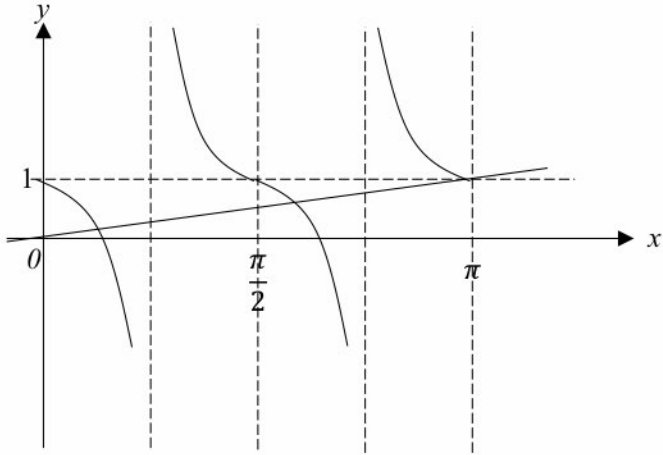


13	(a)	 Vshape Domain $-2 \leq x \leq 6$ Koordinat $(-2, 7), (6, 9), (1.5, 0), (0, 3)$	P1 P1 N1
	(b)	$2x - 3 = 0$ $x = \frac{3}{2}$ Titik minimum $(\frac{3}{2}, 0)$	N1 N1
	(c)	$2x - 3 < -4 \quad @ \quad 2x - 3 > 4$ $x < -\frac{1}{2} \quad \quad \quad x > \frac{7}{2}$	K1 N1, N1
14	(a)	$\vec{OB} = \vec{OQ} + t(2\mathbf{i} + 3\mathbf{j})$ $\vec{OB} = (20\mathbf{i} + 30\mathbf{j}) + t(2\mathbf{i} + 3\mathbf{j})$ $(20 + 2t)\mathbf{i} + (30 + 3t)\mathbf{j}$	P1 K1 N1
	(b)	$4t\mathbf{i} + 6t\mathbf{j} = (20 + 2t)\mathbf{i} + (30 + 3t)\mathbf{j}$ $4t = 20 + 2t \text{ atau } 6t = 30 + 3t$ $t = 10$ atau Dron A dan dron B bertemu selepas 10 minit (Nota: nampak $\mathbf{i}$ dan $\mathbf{j}$, K0N0)	K1 K1 N1
	(c)	$\vec{OA} = 10(4\mathbf{i} + 6\mathbf{j})$ $(40, 60)$	K1 N1
15	(a)	$\tan 67.5^\circ = \tan \frac{1}{2}(135^\circ)$	P1

		$= \frac{\sin 135^\circ}{1 + \cos 135^\circ}$ $= \frac{1}{\sqrt{2}} \div \left(1 - \frac{1}{\sqrt{2}}\right)$ $= \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2} - 1}$ $= \frac{1}{\sqrt{2} - 1} \times \frac{\sqrt{2} + 1}{\sqrt{2} + 1}$ $= \sqrt{2} + 1$	K1 K1 N1
	(b) (i)	$\cos(\alpha + \beta) = \frac{1}{4}$ $\cos \alpha \cos \beta - \sin \alpha \sin \beta = \frac{1}{4}$ $\cos \alpha \cos \beta - \frac{1}{2} = \frac{1}{4}$ $\cos \alpha \cos \beta = \frac{1}{4} + \frac{1}{2}$ $\cos \alpha \cos \beta = \frac{3}{4}$	K1 N1
	(i)	$\cos(\alpha - \beta)$ $= \cos \alpha \cos \beta + \sin \alpha \sin \beta$ $= \frac{3}{4} + \frac{1}{2}$ $= \frac{5}{4}$	K1 N1



SERTAI TELEGRAM @exercise_students

Soalan			Penyelesaian dan jawapan	Pemarkahan
4	(a)		$\pi j^2 t = 4000$ $t = \frac{4000}{\pi j^2}$ $L = 2\pi j^2 + 2\pi j \left(\frac{4000}{\pi j^2} \right)$ $L = 2\pi j^2 + \frac{8000}{j}$	K1 N1
	(b)		$L = 2\pi j^2 + 8000j^{-1}$ $\frac{dL}{dj} = 4\pi j^2 - 8000j^{-2} \text{ dan } 4\pi j - 8000j^{-2} = 0$ $j = 8.6025$ $\frac{d^2L}{dj^2} = 4\pi + 16000j^{-3},$ $j = \sqrt[3]{\frac{2000}{\pi}}, \frac{d^2L}{dj^2} = 4\pi + 16000 \left(\frac{2000}{\pi} \right)$ $= 12\pi > 0, \frac{d^2L}{dj^2} > 0 \text{ } L \text{ adalah minimum apabila } j = 8.6025$	K1 N1 K1 (pembezaan peringkat kedua) N1
				6
5	(a)		$LHS: \frac{\tan^2 x}{1 + \tan^2 x} = \frac{\tan^2 x}{\sec^2 x}$ $= \left(\frac{\sin^2 x}{\cos^2 x} \right) \times \cos^2 x$ $= \sin^2 x = RHS$	K1 N1
	(b)	(i)	 $\tan 2x + \frac{x}{\pi} = 0$ $\frac{x}{\pi} = -\tan 2x$ Paksi betul $0 \leq x \leq \pi$ Graf $y = 1 - \tan 2x$ dilakar dengan betul dan licin Garis lurus $\tan 2x + \frac{x}{\pi} = 0$ dilakar dengan betul dan tepat	P1 K1 K2 N1 N1
		(ii)	3 penyelesaian	7





Soalan		Penyelesaian dan jawapan	Pemarkahan
6	(a)	$QR = \frac{15-3}{3} = 4$ atau $RS = 12 - 4 = 8$ Luas sektor $PSV = \frac{1}{2}(15)^2(1.2) = 135$ atau Luas sektor $RST = \frac{1}{2}(8)^2(1.2) = 38.4$ atau Luas sektor $QSU = \frac{1}{2}(12)^2(1.2) = 86.4$ Luas kolam ikan hiasan $= 135 - 86.4 + 38.4 = 87$ $87t = 174$ $t = 2$	P1 K1 N1 K1 N1
	(b)	Luas laluan pejalan kaki $\frac{1}{2}(12)^2(2(3.142)) - \frac{1}{2}(8)^2(2(3.142)) = 251.36$ atau Luas taman bunga $\frac{1}{2}(8)^2(2(3.142)) - 38.4 = 162.688$ Kos selenggara air kolam ikan $2 \times \text{RM}225 = \text{RM}450$ atau Kos tanam pokok bunga $162.688 \times \text{RM}5 = \text{RM}813.44$ atau Kos mengecat laluan pejalan kaki $251.36 \times \text{RM}30 = \text{RM}7540.80$ $\text{Jumlah kos} = \text{RM}450 + \text{RM}813.44 + \text{RM}7540.80$ $\text{RM}8804.24$	K1 K1 K1 N1
			9
7	(a)	$a = 2(1)^2 - 5(1) = -3$ $S_2 = 2(2)^2 - 5(2) = -2$ atau $T_2 = -2 - (-3) = 1$ $d = 4$	N1 K1 N1
	(b)	$S_3 = 2(3)^2 - 5(3) = 3$ atau $S_8 = 2(8)^2 - 5(8) = 88 - 3 = 85$	K1 K1 N1
			6
8	(a)	Bezakan $9 - x^2$ terhadap x dan samakan dengan -2 $P(1, 8)$	K1 N1
	(b)	Mencari pintasan $-x$; 3 dan 5 $\left(\frac{1}{2} \times 8 \times 4\right) @ \int_1^3 (9 - x^2) dx$ $\left(\frac{1}{2} \times 8 \times 4\right) - \int_1^3 (9 - x^2) dx$ $\frac{20}{3}$	K1 K1 K1 N1

Soalan			Penyelesaian dan jawapan	Pemarkahan
8	(c)		$\frac{1}{2}\pi \int_k^9 (9-y)dy = \frac{1}{2}\pi \left[9y - \frac{y^2}{2} \right]_k^9$ $\frac{1}{2}\pi \left[9(9) - \frac{9^2}{2} - \left(9k - \frac{k^2}{2} \right) \right] = 16$ $(k-17)(k-1)$ $k = 1 \text{ } k = 17$	K1 K1 K1 N1 10
9	(a)	(i)	$p = \frac{2}{3}, q = \frac{1}{3}, n = 5$ $P(X = 4) = {}^5C_4 \left(\frac{2}{3}\right)^4 \left(\frac{1}{3}\right)^1$ $= 0.3292$	K1 N1
		(ii)	$p = \frac{1}{3}, q = \frac{2}{3}, n = 5$ $P(Y > 2) = P(Y = 3) + P(Y = 4) + P(Y = 5)$ $= {}^5C_3 \left(\frac{1}{3}\right)^3 \left(\frac{2}{3}\right)^2 + {}^5C_4 \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 + {}^5C_5 \left(\frac{1}{3}\right)^5 \left(\frac{2}{3}\right)^0$ $= 0.16461 + 0.041152 + 0.00412$ $= 0.2099$	K1 N1
	(b)	(i)	$X \sim N(2, 0.3^2)$ $P(X > 2.28) = P\left(Z > \frac{2.28 - 2}{0.3}\right)$ $= P(Z > 0.9333)$ $= 0.1754$ 17.54% daripada serangga itu mempunyai panjang lebih daripada 2.28 cm. 17.54% of the insects have a length of more than 2.28 cm.	K1 N1 N1
		(ii)	$P(X < m) = 0.15$ $P\left(Z < \frac{m-2}{0.3}\right) = 0.15$ $\frac{m-2}{0.3} = -1.037$ $m = 1.6889$	K1 K1 N1 10
10	(a)		$y + 2x + 3 = 0$ $y = -2x - 3$ $m_1 = -2$ $-2 \times m_2 = -1 \text{ \&}$ $m_2 = \frac{1}{2}$ $y - (-2) = \frac{1}{2}(x - (-8))$ $y = \frac{1}{2}x + 2$ $2y - x - 4 = 0$	P1 K1 K1 N1

Soalan			Penyelesaian dan jawapan	Pemarkahan							
	10	(b)	$-2x-3=\frac{1}{2}x+2$ $x=-2$ $y=1$ $Q(-2,1)$	K1 N1 N1							
			$\frac{1}{2}\begin{vmatrix} -8 & -2 & h & -8 \\ -2 & 1 & -5 & -2 \end{vmatrix}=\frac{45}{2}$ $ ((-8)(1)+(-2)(-5)+(h)(-2))-((-2)(-2)+(h)(1)+(-5)(-8)) =45$ $-42-3h=\pm 45$ $-42-3h=45 \quad , \quad -42-3h=-45$ $h=-29(\text{abaikan}) \quad , \quad h=1$	K1 K1 N1 10							
11	(a)		<table border="1"><tr><td>$\log_{10} y$</td><td>0.30</td><td>0.40</td><td>0.51</td><td>0.58</td><td>0.70</td><td>0.79</td></tr></table>	$\log_{10} y$	0.30	0.40	0.51	0.58	0.70	0.79	N1
$\log_{10} y$	0.30	0.40	0.51	0.58	0.70	0.79					
	(b)		$\log_{10} y=kx+\log_{10} h$ atau $\lg=kx+\lg h$	P1							
	(c)		Graf $\lg y$ melawan x (0.1, 0.30)								





Soalan			Penyelesaian dan jawapan	Pemarkahan
11	(d)	(i)	$k = *m$ [Dua nilai yang diambil mesti berada pada garis lurus penyuaian terbaik] $k = *0.98$ $0.9 < k < 1.1$ $\log_{10} h = *c$ $h = *1.585$ K0N0 = Jika menggunakan nilai yang tidak diambil dari graf $0.19 \leq h \leq 0.21$	K1 N1 K1 N1
		(ii)	3.548	N1
				10
12	(a)		60° $(\sqrt{n})^2 = 3^2 + 5^2 - 2(3)(5) \cos 120^\circ @$ $(\sqrt{n})^2 = m^2 + 5^2 - 2(m)(5) \cos 60^\circ$ $n = 49$ $(m + 3)(m - 8) = 0$ DAN $m = -3, m = 8$ (mesti tunjuk pemfaktoran & 2 nilai m) $m = 8$	P1 K1 N1 N1
	(b)		$\frac{DE}{\sin 25^\circ} = \frac{18}{\sin 95^\circ}$ $DE = 7.636$ $BD = 18.25 @ BF = 8.204$ $DF^2 = 7.636^2 + 18^2 - 2(7.636)(18) \cos 120^\circ$ DAN $s = \frac{18.25 + 8.204 + 22.80}{2}$ $L = \sqrt{(24.63)(24.63 - 18.25)(24.63 - 22.80)(24.63 - 8.204)}$ $L = 68.73$ [Jawapan dalam 4ab dan 2tp]	K1 N1 P1 K1 K1 N1
				10
13	(a)		$\frac{x + 5}{x} \times 100 = 140$ atau $\frac{8k}{5k} \times 100 = y$ $x = 12.50$ $y = 160$	K1 N1 N1
	(b)		$\frac{7(140) + 1(120) + 4(160) + n(110)}{7 + 1 + 4 + n} = 131$ $n = 8$	K1 N1

Soalan			Penyelesaian dan jawapan	Pemarkahan
13	©	(i)	$\frac{131}{100} \times \frac{115}{100} \times 100$ 150.65	K1 N1
		(ii)	$P_{25} = 24.10$	P1
		(iii)	$\frac{7(I)+1(120)+4(160)+8(110)}{7+1+4+8} = 150.65$ $I = 196.14$	K1 N1
14	(a)		$x + y < 10$ $y < 2x$ $x > 2$	N1 N1 N1
	(b)		1 garis betul 3 garis betul R betul	K1 K1 N1
	(c)	(i)	$y = 8$ $x_{max} = 1$	N1
		(ii)	$K = 200x + 300y$ or $K = 2x + 3y$ Kos maks di (3,6) $K = 200(3) + 300(6)$ $= 2400$	P1 K1 N1

Soalan		Penyelesaian dan jawapan	Pemarkahan
15	(a)	$\frac{dv}{dt} = 2t - 6 = 0$ $(3)^2 - 6(3) + p = -25$ $p = -16$	K1 K1 N1
	(b)	$s = \int (t^2 - 6t - 16) dt$ $s = \frac{1}{3}t^3 - 3t^2 - 16t + c$ $t = 0, s = 0$ $0 = \frac{1}{3}(0)^3 - 3(0)^2 - 16(0) + c$ $c = 0$ $s = \frac{1}{3}t^3 - 3t^2 - 16t$ Apabila $t = t, s = -16t$ $\frac{1}{3}t^3 - 3t^2 - 16t = -16t$ $\frac{1}{3}t^3 - 3t^2 = 0$ $t^2 \left(\frac{1}{3}t - 3 \right) = 0$ $t^2 = 0, \quad \frac{1}{3}t - 3 = 0$ $t = 0 \text{ s}, \quad t = 9 \text{ s}$ $t > 0$, maka $t = 9 \text{ s}$	K1 K1 K1 N1
	(c)	Apabila zarah berhenti seketika, $v = 0 \text{ ms}^{-1}$ $t^2 - 6t - 16 = 0$ $(t + 2)(t - 8) = 0$ $t = -2, t = 8$ Apabila $t = 8$, $\frac{1}{3}(8)^3 - 3(8)^2 - 16(8) = -149\frac{1}{3}$ ATAU $\int_0^8 (t^2 - 6t - 16) dt$ $= \left[\frac{1}{3}(8)^3 - 3(8)^2 - 16(8) \right] - \left[\frac{1}{3}(0)^3 - 3(0)^2 - 16(0) \right]$ $= 149\frac{1}{3}$	K1 K1 N1

Skema pemarkahan tamat/ End of marking scheme

