SULIT
3472/1
Matematik Tambahan
2024

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2024

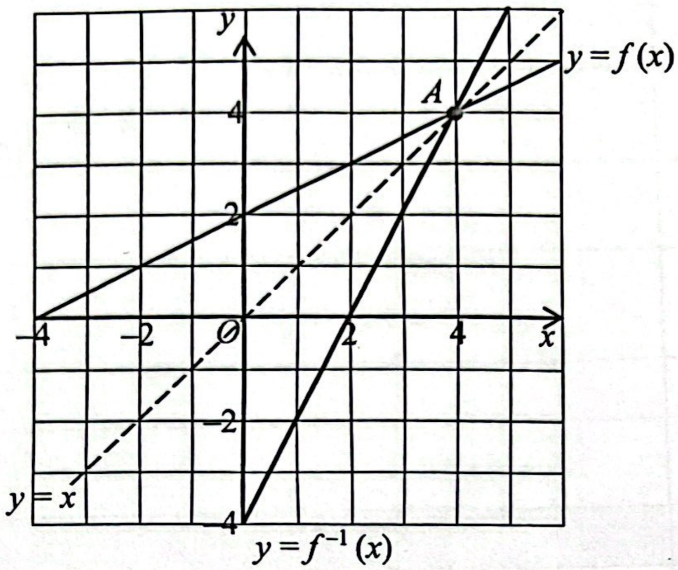
PERATURAN PERMARKAHAN
MATEMATIK TAMBAHAN KERTAS 1

Soalan		Skema Pemarkahan	Markah
1	(a)	$\sqrt{\left(\frac{\sqrt{3}}{2}\right)^2+\left(-\frac{1}{2}\right)^2}$ atau $\sqrt{\left(\sqrt{3}\right)^2+(-1)^2}$	K1
		Ya, sebab magnitud vektor = 1.	N1
	(b)	$\begin{pmatrix}3\\8\end{pmatrix}+\begin{pmatrix}p\\q\end{pmatrix}=\begin{pmatrix}8\\4\end{pmatrix}$	K1
		$\begin{pmatrix}p\\q\end{pmatrix}=\begin{pmatrix}5\\-4\end{pmatrix}$ atau $3+p=8$ atau $8+q=4$	K1
		$p=5$ dan $q=-4$	N1
			5
2	(a)	$gh(x)=-4(2x-1)+2$	K1
		$gh(x)=-8x+6$	N1
	(b)	$-8\left(\frac{x}{2}\right)+6=2$	K1
		$x=1$	N1
			4
3	(a)	$(-64)+(n-1)(7)<0$ ATAU $-64,-57,-50,-43,-36,-29,-22,-15,-8,-1$	K1
		10	N1
	(b)	$\frac{3}{2}(10)$ atau $n_{\text{positif}}=15$	K1
		$\frac{15}{2}[2(6)+(15-1)(7)]$	K1
		825	N1
			5

$-4\sqrt{x} = -10$

$\sqrt{x} = -$

Soalan		Skema Pemarkahan	Markah
4	(a)	$4x-2(2)\sqrt{x}+1=4x-9$	K1
		$x=\frac{25}{4}$	N1
	(b)	$4=x^k$ atau $x=\sqrt[k]{4}$ atau $\frac{\log_4 4}{\log_4 x}$ atau $\log_4 x=\frac{1}{k}$	K1
		$\log_4(4^{\frac{1}{k}})^{\frac{1}{3}}$ atau $\frac{1}{3}\log_4 x$	K1
		$\frac{1}{3k}$	N1
			5
5	(a)	$(y-4)\log 7=2x\log 3$	K1
		$y=1.129x+4$	N1
	(b)	$2^x\times 2^5$ atau $2^x\times 2^3$ atau $2^x\times 2^2$	K1
		$2^x(36)$	K1
		36 ialah gandaan bagi 4 atau setara	N1
			5
6	(a)	$y-x^2=4x+4$	P1
		$Y=y-x^2$	N1
	(b)	$\frac{5-4}{h-0}=4$ atau $5=4(h)+4$	K1
		$h=\frac{1}{4}$	N1
			4
7	(a)	$\frac{dy}{dx}=3px^2+2qx$	K1
		$3p(1)^2+2q(1)=5$	K1
		$q=\frac{5-3p}{2}$	N1
	(b)	$\frac{dy}{du}=-\frac{5}{2}u^{-6}$ atau $\frac{du}{dx}=-3$	K1
		$\frac{dy}{dx}=-\frac{5}{2}u^{-6}\times -3$	K1
		$\frac{dy}{dx}=\frac{15}{2(6-3x)^6}$	N1
			6

<table>
<tr><th colspan="2">Soalan</th><th>Skema Pemarkahan</th><th>Markah</th></tr>
<tr><td>8</td><td>(a)(i)
(ii)</td><td> 

Lukis graf $y = x$ dan garis lurus $y = f^{-1}(x)$
Tanda dan label titik A</td><td>K1
K1</td></tr>
<tr><td></td><td>(b)(i)</td><td>$200 + 3n^2 = 500$</td><td>K1</td></tr>
<tr><td></td><td></td><td>$n = 10$</td><td>N1</td></tr>
<tr><td></td><td>(b)(ii)</td><td>$40q \geq 116000$ atau setara</td><td>K1</td></tr>
<tr><td></td><td></td><td>$200 + 3n^2 \geq 2900$ atau setara</td><td>K1</td></tr>
<tr><td></td><td></td><td>$n = 30$</td><td>N1</td></tr>
<tr><td></td><td></td><td></td><td>7</td></tr>
<tr><td>9</td><td>(a)</td><td>$\dfrac{1}{p}$</td><td>P1</td></tr>
<tr><td></td><td>(b)</td><td>$p = 1 - 2\sin^2 \dfrac{\theta}{2}$</td><td>K1</td></tr>
<tr><td></td><td></td><td>$\sqrt{\dfrac{1-p}{2}}$</td><td>N1</td></tr>
<tr><td></td><td></td><td></td><td>3</td></tr>
</table>

Soalan		Skema Pemarkahan	Markah
10	(a)	$\int_0^2 2g(x)\,dx + \int_0^2 1\,dx$ atau $[x]$	K1
		$\frac{7}{8(3-x)^2}$	K1
		$\frac{7}{8(3-2)^2} - \frac{7}{8(3-0)^2} + 2 - 0$	K1
		$\frac{25}{9}$	N1
	(b)	$\int_{4p}^{4p} f(x)\,dx = 2p-1$	K1
		$2p-1=0$	K1
		$\frac{1}{2}$	N1
			7
11	(a)	$3\times2\times2\times1\times1\times1\times3$ atau setara	K1
		$3\times2\times2\times1\times1\times1\times3\times5$ atau setara	K1
		180	N1
	(b)	${}^8C_3\times{}^nC_2$ atau ${}^8C_4\times{}^nC_1$ atau ${}^8C_5\times{}^nC_0$	K1
		$\frac{n(n-1)(n-2)!}{(n-2)!2!}$	K1
		$\frac{56n(n-1)(n-2)!}{(n-2)!2!} + 70n + 56 = 1316$	K1
		6	N1
			7
12	(a)(i)	$1-k-m$	P1
	(ii)	${}^3C_3p^3q^0 = \frac{1}{64}$	K1
		$p=\frac{1}{4}$ atau 0.25	N1
	(b)	$P\left(Z \geq \frac{8-15}{\sigma}\right) = 0.6844$ atau $z = (-)0.48$	K1
		$\frac{8-15}{\sigma} = -0.48$	K1
		$\sigma = 14.58$	N1
			6

Soalan		Skema Pemarkahan	Markah
13	(a)	$\left(\frac{8-(-2)}{-4-6}\right)m_2 = -1$ atau setara	K1
		$\frac{y-8}{x-(-4)} = 1$ atau setara	K1
		$y = x+12$	N1
	(b)	$\frac{1}{2}\left\|[8x+(-4)(-2)+6y]-[(-4)y+(8)(6)+(-2)x]\right\|$	K1
		$\|5x+5y-20\|$	N1
	(c)	$\|5x+5(x+12)-20\| = 60$	K1
		$10x+40 = -60$	K1
		$A(-10,2)$	N1
			8
14	(a)	$x^2+\left(\frac{b}{a}\right)x+\left(\frac{b/a}{2}\right)^2-\left(\frac{b/a}{2}\right)^2+\frac{c}{a}$	K1
		$\left(x+\frac{b}{2a}\right)^2-\left(\frac{b}{2a}\right)^2+\frac{c}{a}$	K1
		$x = \frac{-b}{2a}+\frac{\sqrt{b^2-4ac}}{2a}$	N1
	(b)	$\frac{-(-2k)\pm\sqrt{(-2k)^2-4(1)(2-k)}}{2(1)}$	K1
		$k\pm\sqrt{k^2+k-2}$	N1
	(c)	$(k+2)(k-1)\geq 0$	K1
		(−3+2)(−3−1) (0+2)(0−1) (2+2)(2−1) + − + $k\leq -2$ $-2\leq k\leq 1$ $k\geq 1$ atau kaedah setara yang menggunakan garis nombor	K1
		$k\leq -2,\ k\geq 1$	N1
			8

Soalan		Skema Pemarkahan	Markah
15	(a)	$\frac{a^2}{a^2}+\frac{b^2}{a^2}=\frac{c^2}{a^2}$, c ialah hipotenus segi tiga bersudut tegak.	K1
		$\tan^2\theta+1=\text{sek}^2\theta$	N1
	(b)	$(2\sin x-1)(\sin x+1)=0$	K1
		sudut rujukan 30°	K1
		30°, 150° dan 270°	N1
	(c)	$\text{kos}\,x\,\text{kos}\,y+q=\frac{p}{q}$ atau $*\left(\frac{p}{q}-q\right)-\sin x\sin y$	K1
	(i)	$\frac{p}{q}-q$	N1
	(ii)	$\frac{p}{q}-2q$	N1
			8

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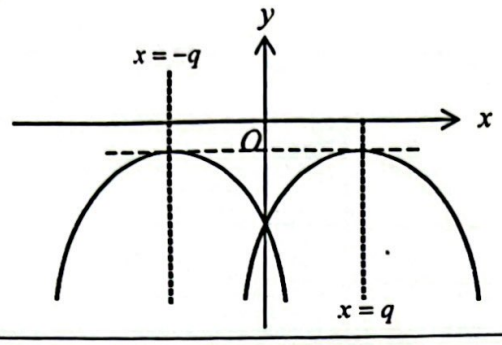
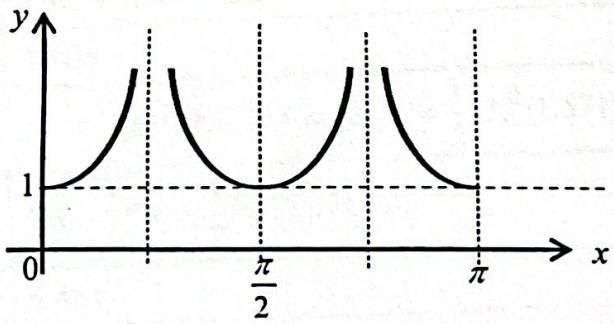
PERATURAN PERMARKAHAN
MATEMATIK TAMBAHAN KERTAS 2

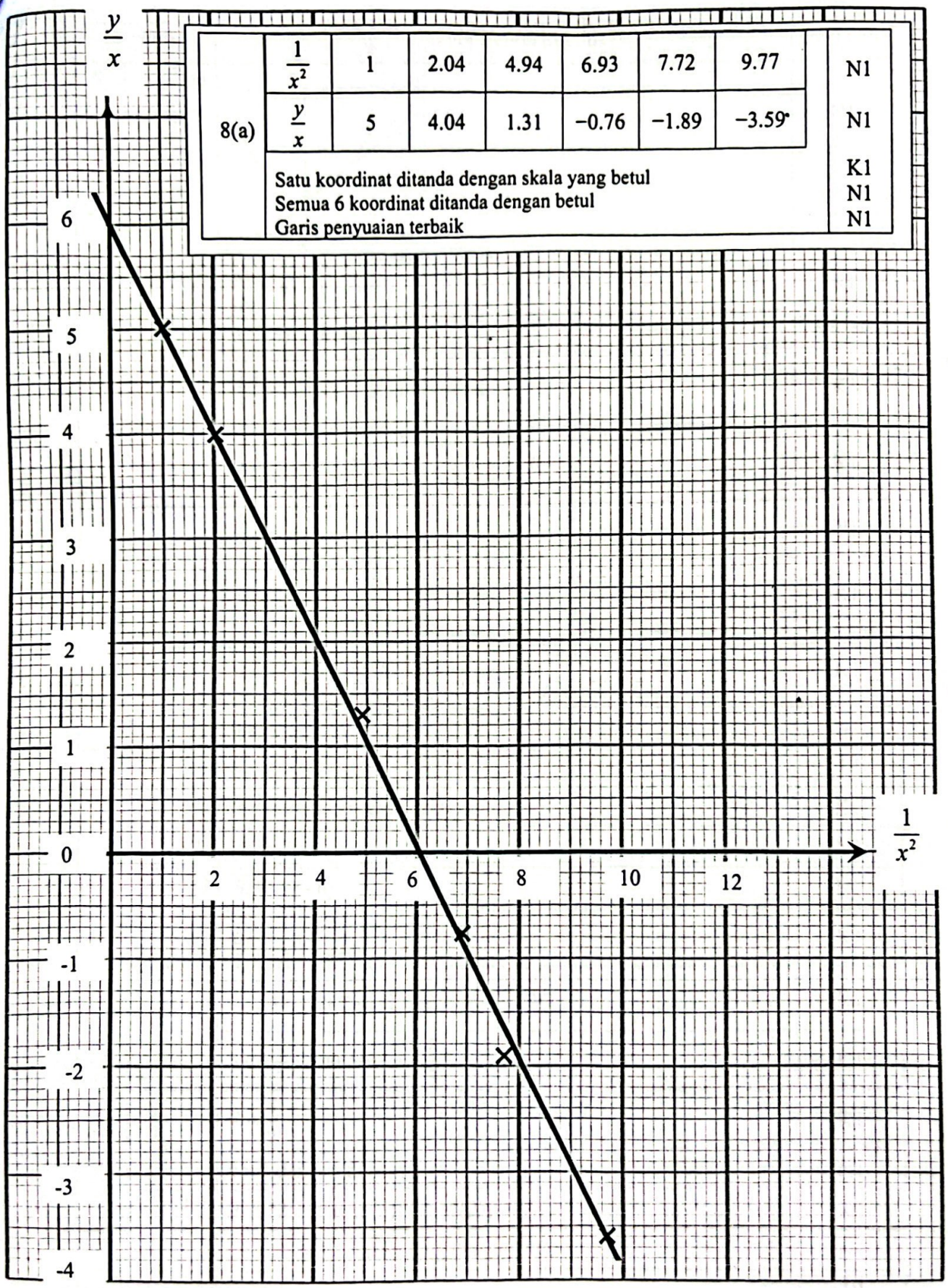
Soalan		Skema Pemarkahan	Markah
1	(a) (i)	$(2q)^2-4(-1)(-5q+1)<0$	K1
		$p>\dfrac{q^2+1}{5}$	N1
	(ii)	 Bentuk graf Pantulan paksi-y DAN simetri di $x=-q$	P1 P1
	(b)	a dalam julat $-2<a<0$ dilihat	K1
		$h(x)=*ax^2+3$	N1
			6
2	(a)	$\dfrac{-10(1)+22(3)}{1+3}=h$ atau $\dfrac{k(1)+12(3)}{1+3}=10$	K1
		$h=14$, $k=4$	N1N1
	(b)	$m_1=\dfrac{12-4}{22-(-10)}$ atau setara DAN $*m_1m_2=-1$	K1
		$y-*4=-4(x-(-10))$	K1
		$y=-4x-36$	N1
	(c)	$\sqrt{(x-22)^2+(y-12)^2}=13$	K1
		$x^2+y^2-44x-24y+459=0$	N1
			8
3	$x=2y-4$ atau setara		P1
	$4(2y-4)^2+3y^2-2y(2y-4)=20$ atau setara		K1
	$y=\dfrac{-(-56)\pm\sqrt{(-56)^2-4(15)(44)}}{2(15)}$ atau setara		K1
	$y=2.609,\ 1.124$ $x=1.218,-1.752$		N1 N1
	(1.218, 2.609) & (−1.752,1.124)		N1
			6

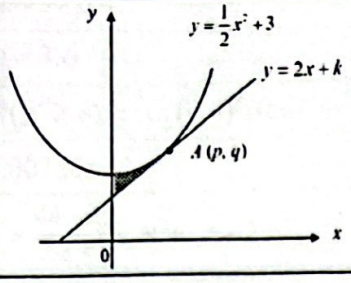
Soalan		Skema Pemarkahan	Markah
4	(a)(i)	$\frac{2\beta+2}{\beta+1}=\frac{\beta+1}{\beta-2}$ DAN selesaikan β	K1
		$\beta=5$	N1
	(ii)	$r=\frac{5+1}{5-2}$ atau $r=2$	K1
		Hasil tambah ketakterhinggaan tidak wujud kerana $r>1$.	N1
	(b)(i)	$\frac{x(1-0.95^8)}{1-0.95}=201.95$	K1
		30	N1
	(ii)	$30(0.95)^{n-1}>18$	K1
		$n=10$	N1
		40	N1
			9
5	(a)	$\frac{2\sin x\kos x}{2\kos^2 x-1}$	K1
		$\tan 2x$	N1
	(b)		
		Graf tan x (paksi menggunakan pembaris)	P1
		Graf $\lvert \tan 2x \rvert$ dan label 0 dan π	P1
		Graf $\lvert \tan 2x \rvert + 1$ tepat dan label 1	P1
	(c)(i)	$y=kx$	P1
	(ii)	$k<\frac{1}{\pi}$	P1
			7

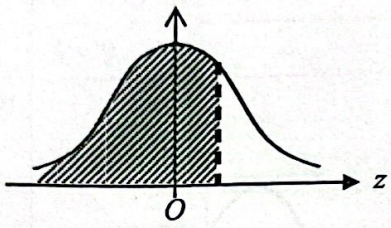
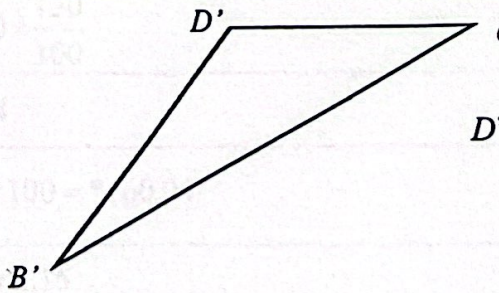
Soalan		Skema Pemarkahan	Markah
6	(a)	$\delta x = 0.06$ atau $\frac{dA}{dx} = 4x - \frac{540}{x^2}$	K1
		$\delta A = \left[4(3) - \frac{540}{(3)^2}\right] \times 0.06$	K1
		$\delta A = -2.88$	N1
		$\frac{2.88}{198} \times 100$	K1
		1.455 %	N1
	(b)	$4x - \frac{540}{x^2} = 0$	K1
		5.1299 atau 5.130	N1
			7
7	(a)	1.047 rad	N1
	(b)(i)	$6(0.5235)$ atau $3(1.571)$ atau $3-(6-\sqrt{27})$	K1
		$*BC + *DC + *BD$	K1
		10.05	N1
	(ii)	$A_1 = \frac{1}{2}(6)^2(0.5235)$ atau $A_2 = \frac{1}{2}(3)^2(1.571)$	K1
		$*A_2 - \left(*A_1 - \frac{1}{2}(\sqrt{27})(3)\right)$	K1
		5.441	N1
			7
8	(a)	Rujuk muka surat 5	
	(b)	$\frac{y}{x} = -\left(\frac{r}{p}\right)\left(\frac{1}{x^2}\right) + p$	P1
	(i)	$p = 6$	N1
	(ii)	$\frac{6-(-2.9)}{0-9} = -\frac{r}{*6}$	K1
		$r = 5.93 \pm 0.05$	N1
	(iii)	$y = 1$	N1
			10

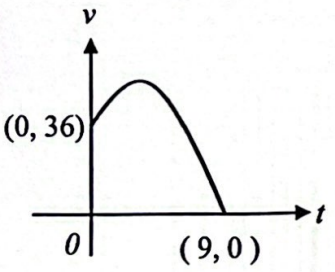
8(a)	$\frac{1}{x^2}$	1	2.04	4.94	6.93	7.72	9.77
	$\frac{y}{x}$	5	4.04	1.31	−0.76	−1.89	−3.59

Satu koordinat ditanda dengan skala yang betul	K1
Semua 6 koordinat ditanda dengan betul	N1
Garis penyuaian terbaik	N1



Soalan		Skema Pemarkahan	Markah
9	(a)		N1
	(b) (i)	$\frac{dy}{dx}=x$ atau $x=2$	K1
		$A(2,5)$, $k=1$	N1, N1
	(ii)	$\left[\frac{1}{2}\left(\frac{x^3}{3}\right)+3x\right]$ atau $\left[\frac{2x^2}{2}+x\right]$	K1
		$\left[\frac{1}{2}\left(\frac{2^3}{3}\right)+3(2)-0\right]-\left[\frac{2(2)^2}{2}+2-0\right]$	K1
		$\frac{4}{3}$	N1
	(c)	$\pi\left[\frac{2y^2}{2}-6y\right]$	K1
		$\pi\left[\left(\frac{2(*5)^2}{2}-6(*5)\right)-\left(\frac{2(3)^2}{2}-6(3)\right)\right]$	K1
		4π	N1
			10
10	(a)	$\overrightarrow{AB}+\overrightarrow{BC}$ atau $\overrightarrow{BA}+\overrightarrow{AD}$	K1
	(i)	$\overrightarrow{AC}=2\underline{x}+5\underline{y}$	N1
	(ii)	$\overrightarrow{BD}=3\underline{x}-6\underline{y}$	N1
	(b)	$\overrightarrow{BE}=\frac{4}{3}\underline{x}-\frac{8}{3}\underline{y}$	K1
		$*\left(\frac{4}{3}\underline{x}-\frac{8}{3}\right)\underline{y}=\lambda(3\underline{x}-6\underline{x})$ atau setara	K1
		$3\lambda=\frac{4}{3}$ atau $-6\lambda=-\frac{8}{3}$	K1
		$\lambda=\frac{4}{9}$	K1
		$h=4$ dan $k=5$	N1
	(c)	9^2+12^2 atau $[3(3)]^2+[-6(2)]^2$	K1
		$15=15$. AB berserenjang dengan AD.	N1
			10

Soalan		Skema Pemarkahan	Markah
11	(a)(i)	$\mu = 9 \times 0.4$	K1
		$\mu = 3.6$	N1
	(ii)	$P(X \geq 8) = {}^9C_8(0.4)^8(0.6)^1 + {}^9C_9(0.4)^9(0.6)^0$	K1
		0.003801	N1
	(b)(i)	$z = \frac{44-35}{4.5}$ atau $z = 2$	K1
		0.0228	N1
	(ii)		P1
		$P(Z < \frac{k-35}{4.5}) = 0.56$ atau $z = 0.151$	K1
		$\frac{k-35}{4.5} = 0.151$	K1
		$k = 35.68$	N1
			10
12	(a)(i)	$BD^2 = 12.8^2 + 5.6^2 - 2(12.8)(5.6)\cos 42°$	K1
		9.416	N1
	(ii)	$\frac{\sin \angle B}{3.9} = \frac{\sin 115°}{*9.416}$	K1
		$\angle B = 22.05°$	N1
	(iii)	$\frac{1}{2}(12.8)(5.6)\sin 42°$	K1
		23.98	N1
	(iv)	$\frac{1}{2} \times 12.8 \times t = *23.98$	K1
		3.747	N1
	(b)(i)	 D' sudut cakah	K1
	(ii)	$\angle C'D'B' = 137.05°$	N1
			10

Soalan		Skema Pemarkahan	Markah
13	(a) (i)	$a=0$ dan $t=\frac{5}{2}$	P1
		$v_{maks}=\frac{-2t^2}{2}+5t+c$ dan $-\left(\frac{5}{2}\right)^2+5\left(\frac{5}{2}\right)+36$	K1
		42.25	N1
	(ii)	$t^2-5t-36=0$	P1
		$(t+4)(t-9)=0$	K1
		$k=9$	N1
	(b)	 Bentuk graf (0,36) dan (9,0)	P1 P1
		$\left[-\frac{(9)^3}{3}+\frac{5(9)^2}{2}+36(9)\right]-0$	K1
		283.5	N1
			10
14	(a)	$\frac{2.16}{1.80}\times100$, $\frac{2.80}{y}\times100=140$	K1
		$x=120$, $y=2$	N1 , N1
	(b)	$\frac{*120(4)+130(3)+140(1)+114m}{4+3+1+m}=123.80$	K1
		$1010+114m=123.80(8+m)$	K1
		$m=2$	N1
	(c)(i)	$123.80\times\frac{130}{100}$	K1
		160.94	N1
	(ii)	$\frac{3.46}{P_{2010}}\times100=*160.94$	K1
		$P_{2010}=2.15$	N1
			10

Soalan		Skema Pemarkahan	Markah
15	(a)	$50x + 75y \leq 6000$ atau setara	N1
		$50x + 60y \geq 3000$ atau setara	N1
		$\frac{x}{y} \geq \frac{1}{2}$ atau $y \leq 2x$	N1
	(*b*)	Satu garis lurus betul Ketiga-tiga betul Rantau berlorek *R*	K1 K1 N1
	(c)	$k = 70x + 120y$	K1
		Garis lurus fungsi objektif yang selari dengan $70x + 120y = 840$	K1
		70(30) + 120(60)	K1
		9300	N1
			10