



KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI TERENGGANU

MPP 3

SPM 2025

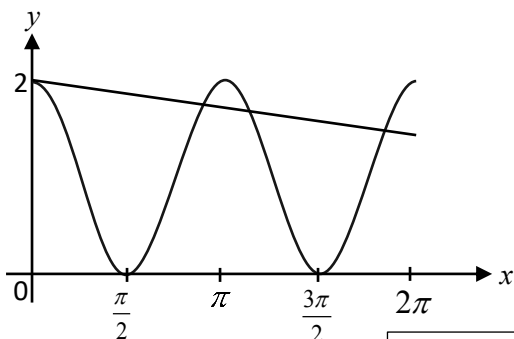
PERATURAN PEMARKAHAN

MATEMATIK TAMBAHAN

PERATURAN PEMARKAHAN MATEMATIK TAMBAHAN KERTAS 1
MPP3 TINGKATAN 5 2025

No	Skema Pemarkahan	Σ Markah
1	$x = \frac{5+3y}{2} \text{ atau } y = \frac{2x-5}{3} \quad \text{P1}$ $2\left(\frac{5+3y}{2}\right)^2 + y^2 = 8 \quad \text{atau} \quad 2x^2 + \left(\frac{2x-5}{3}\right)^2 = 8 \quad \text{K1}$ Selesaikan persamaan kuadratik menggunakan rumus kuadratik atau penyempurnaan kuasa dua. K1 $y = -0.343, \quad y = -2.38 \quad \text{N1}$ $x = 1.99, \quad x = -1.08 \quad \text{N1}$	5
2	$\frac{x}{y} = \frac{x^3}{2} - \frac{8}{2} \quad \text{K1}$ $Y = \frac{x}{y} \text{ dan } X = x^3 \quad \text{N1}$	2
3	(a) $m = 5$ N1 (b) $f^{-1}(x) = x - 4$ K1 $g(x) = \frac{x-8}{x-3}, x \neq 3 \quad \text{N1}$	3

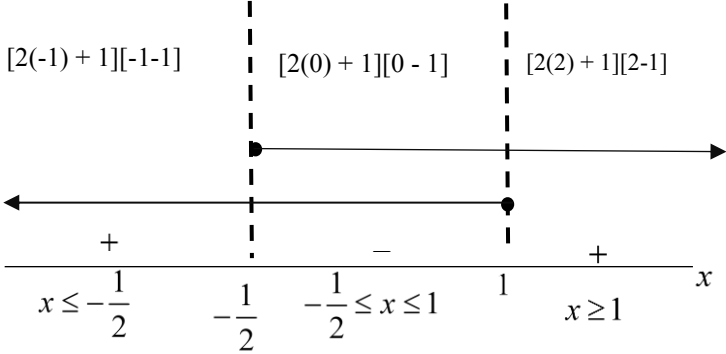
4	(a) (i) $\lambda = 3$ $n = \frac{10}{3}$ (ii) $\sqrt{7^2 + 9^2} = \sqrt{(n-1)^2 + 3^2}$ $n = -10, \quad n = 12$ (b) $\frac{1}{m-1}$ or $\frac{8}{9}$ seen $\frac{1}{m-1} \times \frac{8}{9} = -1$ $m = \frac{1}{9}$	K1 N1 K1 N1 P1 K1 N1 7
5	$60^\circ @ \frac{\pi}{3}$ $2(p) \sin \frac{60}{2} @ (p) \left(\frac{60 \times \pi}{180} \right)$ $p + \frac{p}{3} \pi$	P1 K1 N1 3
6	$-p \log_3 3 @ -1 \log_3 6 @ \log_3 6$ $\log_3 3 + \log_3 2$ (Guna hukum pendaraban logaritma) $1 + \log_3 2$	K1 K1 N1 3

7	(a) $a = 30000, r = 1.025$ $S_7 = \frac{30000(1.025^7 - 1)}{1.025 - 1}$ $= 226422$ (b) $S_7 - S_2 = \frac{30000(1.025^7 - 1)}{1.025 - 1} - \frac{30000(1.025^2 - 1)}{1.025 - 1}$ $= 165672$ $\frac{24}{100} \times (165672) = 39761$ @ $\frac{15}{100} \times (165672) = 24850$ Jumlah = $39761 + 24850$ $= 64611$	K1 K1 N1 K1 K1 N1 7
8	(a)  Bentuk Kosinus P1 2 Kitaran untuk $0 \leq x \leq 2\pi$ P1 Anjakan 1 unit ke atas P1 (b) $y = 2 - \frac{x}{4\pi}$ P1 4 penyelesaian N1 Nota : 0 dan 2π mesti dilabel Alat tepi lurus digunakan	5

9	(a) (i) $y + \delta y = u(x + \delta x).v(x + \delta x)$ atau $\delta y = u(x + \delta x).v(x + \delta x) - u(x).v(x)$ K1 Apabila $\delta x \rightarrow 0$ dan $\delta v \rightarrow 0$ $\frac{dy}{dx} = u \text{ had } \frac{\delta v}{\delta x} + v \text{ had } \frac{\delta u}{\delta x} + \text{had } \frac{\delta u}{\delta x} (0)$ K1 $\frac{dy}{dx} = u(x)v'(x) + v(x)u'(x)$ N1 (ii) $\frac{d}{dx} = (2x - 3)^4(3) + (3x + 2)[8(2x - 3)^3]$ K1 $= (2x - 3)^3(30x + 7)$ N1 (b) $K'(n) = 0$ DAN $0 = 4n - 100$ K1 $n = 25$ N1 $2(25)^2 - 100(25) + 137\,5000$ K1 $137\,3750$ N1	9
10	(a) $2(-10)$ K1 -20 N1 (b) $2 \int_1^3 g(x) dx$ atau $\int_1^3 x dx$ atau $k \int_1^3 dx$ (pisahkan) P1 $\left[\frac{x^2}{2} - kx \right]_1^3$ (kamir) K1 $\left[\left(\frac{(3)^2}{2} - k(3) \right) - \left(\frac{(1)^2}{2} - k(1) \right) \right]$ (ganti had) K1 $k = -\frac{2}{5}$ N1	6

11	(a) (i) $\frac{(n-1)(n-2)(n-3)!}{(n-3)!} @ \frac{x!}{a!(x-a)!} = \frac{x!}{b!(y-n)!}$ $n^2 - 3n + 2$ (ii) $x = a + b$ (b) (i) 462 (ii) ${}^7C_3 \times {}^5C_3$ 350 (iii) ${}^4C_1 \times {}^8C_5 @ {}^4C_2 \times {}^8C_4 @ {}^4C_3 \times {}^8C_3 @ {}^4C_0 \times {}^8C_6$ 896	K1 N1 N1 N1 K1 N1 K1 N1 8
12	$P\left(Z > \frac{136-\mu}{\sigma}\right) = 0.326$ atau $P\left(Z > \frac{88-\mu}{\sigma}\right) = 0.822$ 0.451 @ 0.923 @ -0.923 (dilihat) $\frac{136-\mu}{\sigma} = 0.451$ $\frac{88-\mu}{\sigma} = -0.923$ Selesaikan persamaan linear serentak melibatkan μ dan σ $\mu = 120.24 / 120.25$ dan $\sigma = 34.93 / 34.94$	P1 P1 K1 K1 K1 N1 6

13	(a) $\frac{x-a}{c-x} = \frac{m}{n}$ dan selesaikan K1 Tertunjuk $x = \frac{an+cm}{m+n}$ N1 (b) $x = \frac{1(-3)+2(3)}{2+1}$ @ $y = \frac{2(-2)+1(7)}{2+1}$ K1 $P(1,1)$ N1 (c) $m = \frac{7-(-2)}{-3-3}$ P1 Guna $m_1 m_2 = -1$ K1 $y-1 = m(x-1)$ atau $y = mx+c$ sehingga c K1 $y = \frac{2}{3}x + \frac{1}{3}$ atau setara N1	8
14	(a) (i) $f(x) = \sqrt{2x-4}$ $x = \frac{y^2+4}{2}$ K1 $f^{-1}(x) = \frac{x^2+4}{2}$ N1 (ii) domain $= 0 \leq x \leq 2$ N1 Julat $= 2 \leq f^{-1}(x) \leq 10$ N1 (iii) $f^{-1}f(3) = 3$ N1 (b) $\frac{4}{3} + c = 4$ K1 Selesaikan persamaan linear: $\left[c = 4 - \frac{4}{3} \right]$ K1 $c = \frac{8}{3}$ N1	8

15	(a) $(-7q)^2 - 4(p)(16p) = 0$ 7:8 15 (b) $(2x + 1)(x - 1) \leq 0$ DAN Titik ujian : -1 Titik ujian : 0 Titik ujian : 2 $[2(-1) + 1][(-1) - 1]$ $[2(0) + 1][0 - 1]$ $[2(2) + 1][2 - 1]$  $-\frac{1}{2} \leq x \leq 1$ (c) (i) $a < 0$ (ii) $b = 4$ (iii) $c = 10$	K1 N1 N1 K1 N1 N1 N1
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PERATURAN PEMARKAHAN TAMAT

PERATURAN PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 2
PEPERIKSAAN PERCUBAAN SPM 2025

No		Peraturan Pemarkahan	Jumlah
1	(a)	$\frac{dy}{dx} = -2x + 2$ K1 Ganti $x=1$ dalam $\frac{dy}{dx}$ K1 0 N1	5
	(b)	$3(17+3x)^2(3)$ K1 $9(17+3x)^2$ K1	
2	(a)	$\frac{3}{2}[2a + (3-1)d] = 96$ K1 $a + (20-1)d = 284$ K1 Selesaikan persamaan serentak melibatkan a dan d K1 $a = 18 \text{ cm}$ atau $d = 14 \text{ cm}$ N1 Guna rumus S_n K1 3020 N1	9
	(b)	$T_4 = *18 + (4-1)(*14)$ K1 $6x^2 \leq (*60)(50)$ dan selesaikan ketaksamaan kuadratik K1 $x \leq 22.36$ N1	
3	(a)	$m = 3(3) - 6\sqrt{3} - 6\sqrt{3} + 4(3)$ K1 $m = 21 - 12\sqrt{3}$ N1	5
	(b)	Guna $\log_a \frac{m}{n} = \log_a m - \log_a n$ K1 Guna $\log_a m^n = n \log_a m$ K1 $y + 2x - 3$ N1	

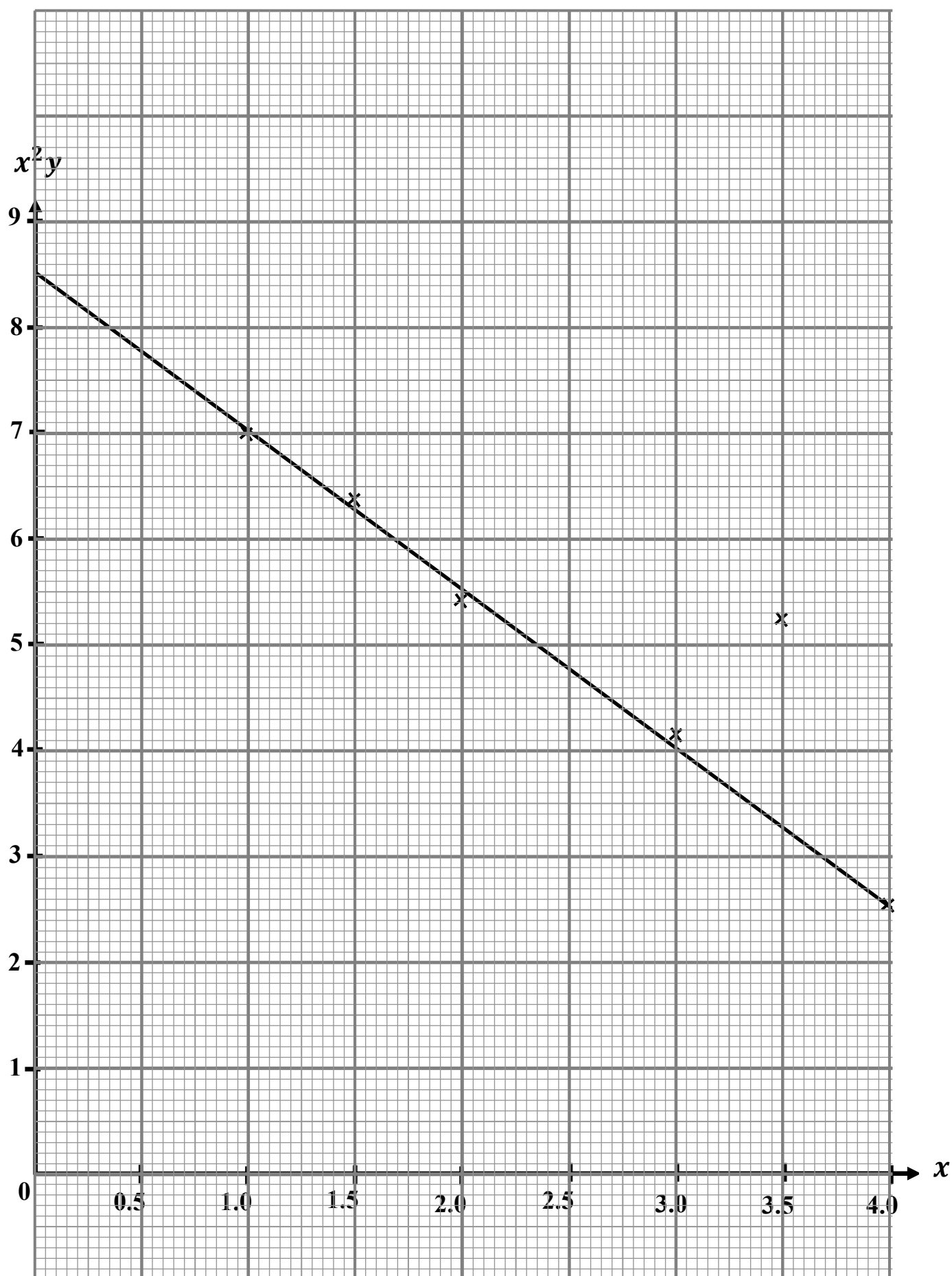
4	(a)	Guna $\operatorname{cosec}^2 A = 1 + \cot^2 A$ $3(2\cos x \sin x)$ $3 \sin 2x$	P1 K1 N1	7
	(b)	$\sin 2x = \frac{\sqrt{3}}{2}$ $\frac{\pi}{3} @ 60^\circ$ (dilihat) $2x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}$ [untuk $0 \leq 2x \leq 4\pi$] $x = \frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}$	P1 N1 N1 N1	
5	(a)	Guna $P(x=r) = {}^nC_r p^r q^{n-r}$ ${}^7C_0(0.15)^0(0.85)^7 + {}^7C_1(0.15)^1(0.85)^6 + {}^7C_2(0.15)^5(0.85)^5$ 0.9262	P1 K1 N1	7
	(b)	$\mu = 150(0.15)$ $\sigma = \sqrt{150(0.15)(0.85)}$ $P\left(Z > \frac{35 - 22.5}{4.3732}\right)$ 0.00213	P1 P1 K1 N1	
6	(a)	Guna $\frac{1}{2} (\quad) - (\quad) $ $\frac{37}{4}$	K1 N1	7
	(b)	$m_{OE} = \frac{-2-0}{2-0} @ m_{CD} = \frac{1-0}{\frac{1}{2}-3}$ $m_1 \neq m_2$, OE dan CD tidak selari	K1 N1	



	(c)	$\sqrt{(x-0)^2-(y-0)^2}$ atau $\sqrt{(x-3)^2-(y-0)^2}$ $3\sqrt{(x-0)^2-(y-0)^2}=\sqrt{(x-3)^2-(y-0)^2}$ $8x^2+8y^2+6x-9=0$	P1 K1 N1								
7		$x-2$ dilihat $x^2-6x+8+\frac{1}{2}r^2\theta=50$ $x^2-6x+8+\frac{1}{2}*(x-2)^2(\pi)-50=0$ Selesaikan * persamaan kuadratik $x=6.816$, $x=-2.038$ $x=6.82$ $r=4.82$ $A_1=(*6.82)^2-6(*6.82)+8$ 13.56–13.59 (julat jawapan) $A_2=\frac{1}{2}(*4.82)^2(3.142)$ 36.44–36.50(julat jawapan)	P1 P1 K1 K1 N1 N1 K1 N1 K1 N1	10							
8	(a)	<table><tr><td>x^2y</td><td>6.98</td><td>6.35</td><td>5.44</td><td>4.14</td><td>5.27</td><td>2.56</td></tr></table>	x^2y	6.98	6.35	5.44	4.14	5.27	2.56	N1	10
x^2y	6.98	6.35	5.44	4.14	5.27	2.56					
(b)	Graf garis lurus x^2y melawan x dilukis DAN sekurang-kurangnya satu *titik diplot dengan betul 6 *titik diplot dengan betul Garis lurus penyuaian terbaik.	K1 N1 N1									

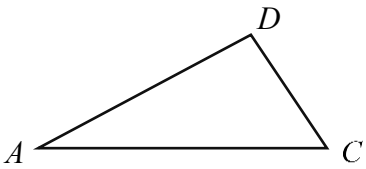
	(c)	(i) $x^2y = -hx + 2k$	P1	
		$h = \frac{3}{2}$	N1	
		$k = 4.250$	N1	
		(ii) $x^2y = 3.30$	P1	
		Julat $3.15 \leq x^2y \leq 3.45$		
		$(3.5)^2y = *3.30$	K1	
		$y = 0.27$	N1	

Graf No 8



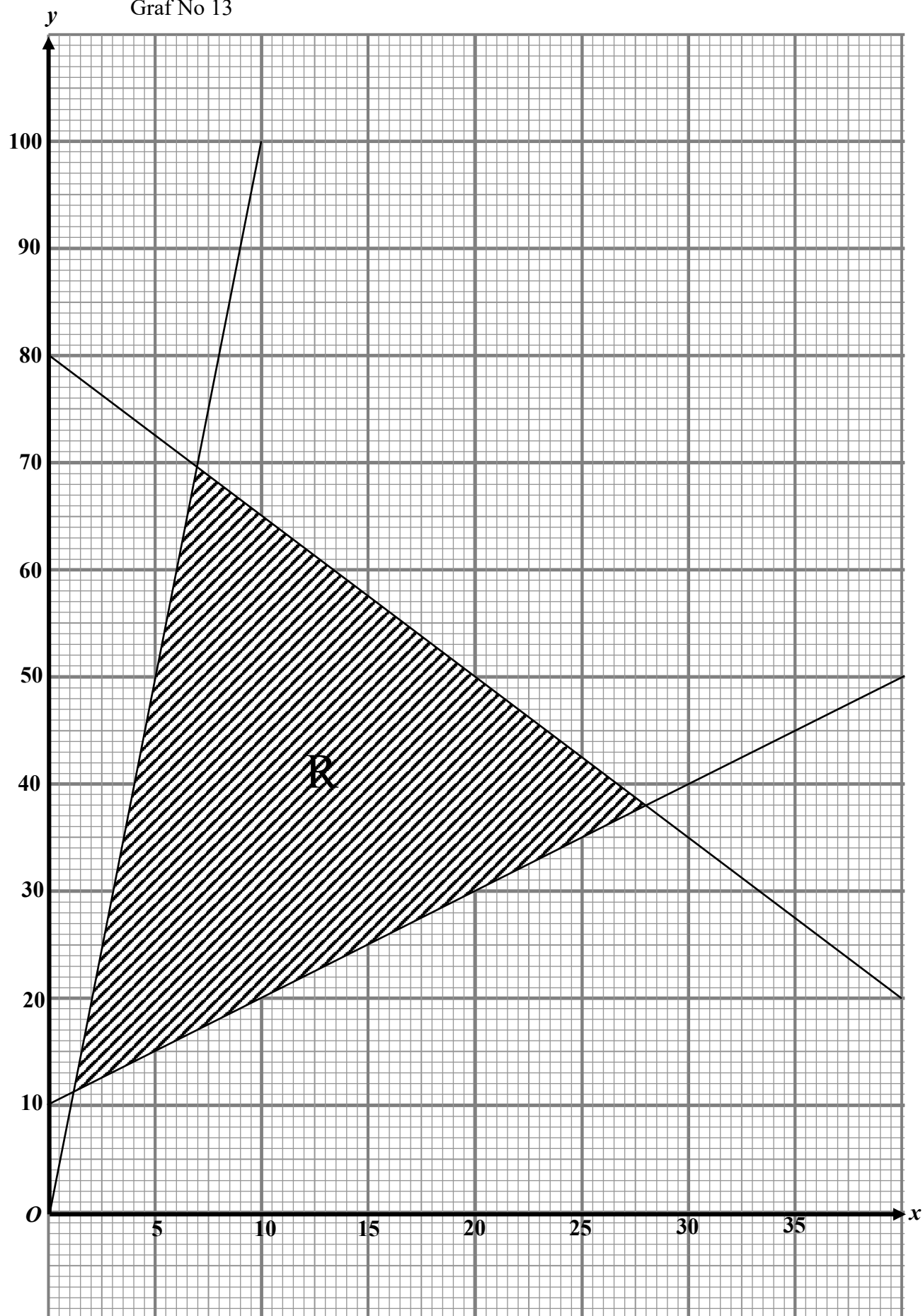
9	(a)	Beza $y = x^2$ terhadap x dan ganti $x = 3$ dalam $\frac{dy}{dx}$ K1 Ganti kecerunan tangen dan titik $P(3,9)$ dalam $y = mx + c$ dan selesaikan untuk mencari c K1 $y = 6x - 9$ N1		10
	(b)	<u>Alternatif A</u> Kamir $\int x^2 dx$ [$A_1 = \frac{x^3}{3}$] K1 Guna had $\int_0^3$ ke dalam A_1 atau $A_2 = \frac{1}{2} \left(\frac{3}{2} \right) (9)$ atau $A_3 = \frac{1}{2} \left(\frac{3}{2} \right) (9)$ K1 $A_1 - A_2 + A_3$ K1 9 N1	<u>Alternatif B</u> Kamir $\int y^{\frac{1}{2}} dx$ [$A_1 = \frac{y^{\frac{3}{2}}}{\frac{3}{2}}$] K1 Guna had $\int_0^9$ ke dalam A_1 atau $A_2 = \frac{1}{2} \times 3 \times 18$ K1 $A_2 - A_1$ K1 9 N1	
	(c)	Kamir $\frac{\pi}{4} \int (x^2)^2 dx$ [Panduan : $\frac{\pi}{4} \left[\frac{x^5}{5} \right]$] ($\frac{\pi}{4}$ mesti ada) K1 $\frac{\pi}{4} \left[\frac{(3)^5}{5} - \frac{(0)^5}{5} \right]$ (ganti had, $\frac{\pi}{4}$ mesti ada) K1 $\frac{243}{20} \pi$ N1		

10	(a)	(i) $\vec{OB} = \vec{OA} + \vec{AB}$ (tuliskan mana-mana hukum segi tiga) $15\hat{i} + 9\hat{j}$ (ii) Guna $\hat{r} = \frac{x\hat{i} + y\hat{j}}{\sqrt{x^2 + y^2}}$ $\frac{5}{\sqrt{34}}\hat{i} + \frac{3}{\sqrt{34}}\hat{j}$ (iii) $\vec{OA} = \sqrt{3^2 + 4^2} = 5$ atau $\vec{AB} = \sqrt{12^2 + 5^2} = 13$ atau $ \vec{OB} = 3\sqrt{34}$ $13^2 = 5^2 + (3\sqrt{34})^2 - 2(5)(3\sqrt{34})\cos\angle AOB$ 22.17°	P1 N1 K1 N1 K1 K1 N1	10
	(b)	(i) $\vec{AR} = 12\hat{i} + 8\hat{j}$ (ii) Tuliskan $\vec{OA} = \lambda \vec{AR}$ dan selesaikan untuk λ (λ_1 & λ_2) $\lambda_1 \neq \lambda_2$ dan O, A dan R tidak segaris	N1 K1 N1	
11	(a)	3.394 (dilihat) $10(*3.394)$ 33.94	K1 N1	10
	(b)	$\frac{*33.94}{2}$ @ $10(2.89)$ $15 + *S_{KN} + *S_{LMN}$ 60.87	K1 K1 N1	

	(c)	1.445 @ 82.78 (dilihat) $A_1 = \frac{1}{2}(10)^2(2\pi)$ $A_2 = \frac{1}{2}(15)(15)\sin 82.78$ $A = A_1 - A_2$ (syarat: $A_1 > A_2$) 202.59 ----- @ ----- 1.445 @ 82.78 (dilihat) $A_1 = \frac{1}{2}(10)^2(2\pi)$ $A_2 = \frac{1}{2}[2(10)\sin 82.78]\left[\sqrt{(15)^2 - \left(\frac{2(10)\sin 82.78}{2}\right)^2}\right]$ ** $A_2 = \frac{1}{2}bh$ $A = A_1 - A_2$ (syarat: $A_1 > A_2$) 202.58	P1 K1 K1 K1 N1 P1 K1 K1 K1 N1	
12	(a)	(i) $\frac{BC}{\sin 48^\circ} = \frac{12}{\sin 63^\circ}$ 10.01 (ii) $DE^2 = 5^2 + 7^2 - 2(5)(7)\cos 69^\circ$ 6.994	K1 N1 K1 N1	
	(b)	(i)  (ii) 69° (iii) $\frac{CD'}{\sin 42^\circ} = \frac{5}{\sin 69^\circ}$ $CD' = 3.584$ Luas segi tiga $AC'D = \frac{1}{2} \times (15.584)(5) \sin 69^\circ$ 36.37	N1 N1 K1 N1 K1 N1	10
13	(a)	$y \geq x + 10$	N1	
	(b)	$3x + 6y \leq 160$ $10x \geq y$	N1 N1	
	(c)	Satu garis lurus dilukis dengan betul Semua garis lurus dilukis dengan betul Rantau dilorek dengan betul	N1 N1 N1	10

	(d)	(i) 76 orang	N1	
		(ii) Titik maksimum (28,37) dan garis fungsi objektif $k = 16x + 8y$ dilukis $k = 16(28) + 8(37)$ 744	N1 K1 N1	

Graf No 13



14	(a)	(i) $a = -2ms^{-2}$ N1 (ii) $8 - 2t = 0$ K1 $t = 4$ N1 (iii) $-20 = 8t - t^2$ K1 $t^2 - 8t - 20 = 0$ $(t - 10)(t + 2) = 0$ K1 $t = 10$ N1 -12 N1	10
	(b)	$OQ = 8(*4) - *4^2$ K1 $20 - *16$ K1 4 N1	
15	(a)	$\frac{100}{x} \times 258 = 120$ @ $\frac{y}{180} \times 100 = 105$ @ $\frac{100}{200} \times 216 = z$ K1 $x = 215, y = 189$ dan $z = 108$ N2,N1,N0	10
	(b)	(i) $\frac{105(5) + 120(7) + 108(3)}{5 + 7 + 3}$ K1 112.60 N1 (ii) $112.6 = \frac{p}{55} \times 100$ K1 61.93 N1	
	(c)	$\frac{150 \times 100}{112.6}$ K1 $133.21 = \frac{p}{60.50} \times 100$ K1 80.59 N1	

PERATURAN PEMARKAHAN TAMAT