

KERTAS MODEL 2

SPM KSSM 2021

MATEMATIK TAMBAHAN

Kertas 2

3472/2

SKEMA PEMARKAHAN

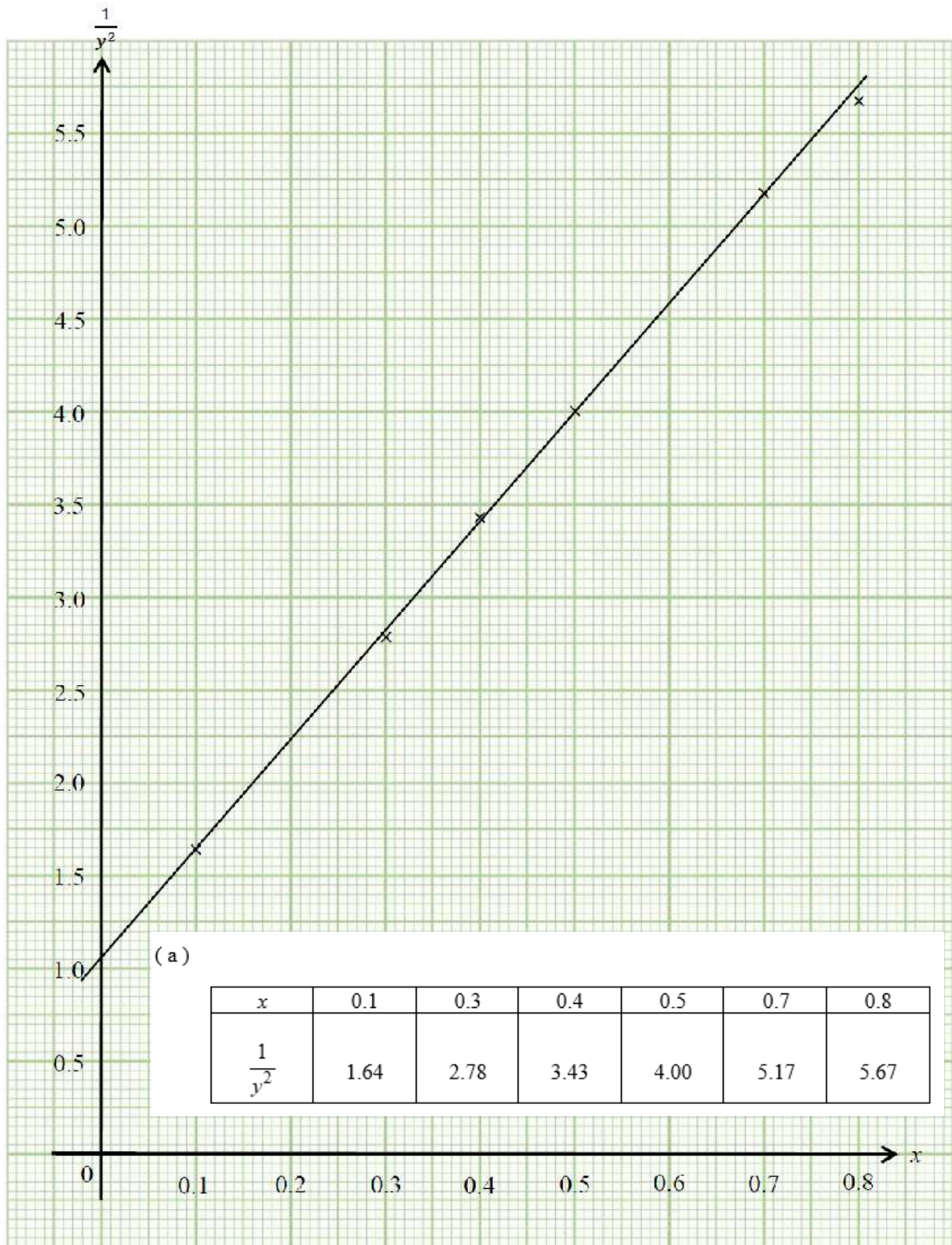
NO	PENYELESAIAN	MARKAH
	BAHAGIAN A	
1	$(2)^2 + (2)(1) + p(1) = q$ atau $2p(2) + 3(1) = q$ $4p + 3 = 6 + p$ $p = 1$ dan $q = 7$ $x^2 + xy + y = 7$ (1) dan $2x + 3y = 7$ (2) $y = \frac{7-2x}{3}$ $x^2 + x\left(\frac{7-2x}{3}\right) + \left(\frac{7-2x}{3}\right) = 7$ $(x-2)(x+7) = 0$ $(-7, 7)$	1 1 1 1 1 1
2	Syarikat Maju; Gaji bulanan ; 3700, 3725, 3750, ... Jumlah gaji dalam masa 3 tahun , $S_{36} = \frac{36}{2}[2(3700) + 35(25)]$ = RM 148 950 Syarikat Teguh; Gaji tahunan ; 48 000, 48 500, 49 000, ... Jumlah gaji dalam masa 3 tahun, $S_n = \frac{3}{2}[2(48 000) + 2(500)]$ = RM 145 500 Beza lebihan gaji = RM 148 950 – RM 138 600 =RM 3450 Syarikat Maju lebih sesuai untuk Razali mendapat gaji maksimum	1 1 1 1 1 1 1

3	(a) Katakan panjang AF = x cm $\text{perimeter} = 2x + 2\pi j = 120$ $x = 60 - \pi j$ $\text{Luas} = x(2j)$ $= (160 - \pi j)(2j)$ $= 120j - 2\pi j^2$ (b) $\frac{dL}{dj} = 0$ $120 - 4\pi j = 0$ $j = \frac{30}{\pi}$ $\text{Luas} = 120 \left(\frac{30}{\pi}\right) - 2\pi \left(\frac{30}{\pi}\right)^2$ $= \frac{1800}{\pi} \text{ cm}^2$	1 1 1 1 1 1
4	4. a) $\text{Luas segitiga} = \frac{1}{2} \times m \times m^2$ $= \frac{m^3}{2}$ $\text{Luas di bawah lengkung} = \int_0^m x^2 dx \quad @ \quad = \left[\frac{x^3}{3}\right]_0^m \quad @ \quad \frac{m^3}{3} - 0 \quad @ \quad \frac{m^3}{3}$ $\text{Luas rantau berlorek} = \frac{m^3}{2} - \frac{m^3}{3} = \frac{4}{3} \quad @ \quad \frac{m^3}{6} = \frac{4}{3}$ $m = 2$ b) $\text{Isipadu kon} = \frac{1}{3} \times \pi \times 4^2 \times 2$ $= \frac{32\pi}{3}$ $\text{Isipadu di bawah lengkung} = \pi \int_0^2 x^4 dx \quad @ \quad = \left[\frac{x^5}{5}\right]_0^2$ $= \frac{32\pi}{5}$ $\text{Isipadu rantau berlorek} = \frac{1}{3} \times \pi \times 4^2 \times 2 - \left[\frac{x^5}{5}\right]_0^2 \quad @ \quad \frac{32\pi}{3} - \frac{32\pi}{5}$ $= \frac{64\pi}{15}$	1 1 1 1 1 1 1

5	(a) $X \sim B(6, 0.55)$ Sisihan piawai = $\sqrt{npq}$ $= \sqrt{6 \times 0.55 \times 0.45}$ $= 1.219$ (b) $P(X > 4) = P(X = 5) + P(X = 6)$ $= {}^6C_5 \times 0.55^5 \times 0.45^1 + {}^6C_6 \times 0.55^6 \times 0.45^0$ $= 0.1359 + 0.02768$ $= 0.1636$ (c) $\mu \geq 9$ $np \geq 9$ $n(0.55) \geq 9$ $n \geq 16.36$ $n = 17$	1 1 1 1 1 1
6	(a) $\tan B = \frac{10}{5} = 2$ $\tan A = \frac{10}{5+QR}$ $\tan(A + B) = -4$ $\Rightarrow \frac{\tan A + \tan B}{1 - \tan A \tan B} = -4$ $\Rightarrow \frac{\frac{10}{5+QR} + 2}{1 - \left(\frac{10}{5+QR}\right)(2)} = -4$ $\Rightarrow \frac{10}{5+QR} + 2 = -4 \left(1 - \left(\frac{10}{5+QR}\right)(2)\right)$ $\Rightarrow \frac{10}{5+QR} + 2 = -4 + \frac{80}{5+QR}$ $\Rightarrow \frac{80}{5+QR} - \frac{10}{5+QR} = 6$ $\Rightarrow \frac{70}{5+QR} = 6$ $\Rightarrow 70 = 6(5 + QR)$ $\Rightarrow 70 = 30 + 6QR$ $\Rightarrow 6QR = 40$	1 1

BAHAGIAN B

8



	(a) $\frac{1}{y^2} = \frac{1}{r}(x) + \frac{s}{r}$ (i) $0.17 \leq r \leq 0.18$ (ii) $0.18 \leq s \leq 0.19$	
9	$\tan \theta = 10/12$ $\theta = 0.6948 \text{ rad}$ (b) (i) $\angle AOB = 1.3896 \text{ rad}$ Panjang lengkok = 8.338 (ii) Perimeter = 24.74 (c) Luas = 13.84	1 1 1 1 3 3
10	(a) Luas segi tiga AOB = $\frac{1}{2} \begin{vmatrix} 0 & -3 & 6 & 0 \\ 0 & 5 & -1 & 0 \end{vmatrix}$ $= \frac{1}{2} (0 + 3 + 0) - (0 + 30 + 0)$ $= \frac{27}{2} \text{ unit}^2$ (b) Kecerunan PQ = $\frac{-1-5}{6+3}$ $= -\frac{2}{3}$ Kecerunan berserenjang dengan garisan dan melalui C $(m_1 m_2 = -1)$ $\left(-\frac{2}{3}\right)(m_2) = -1$ $m_2 = \frac{3}{2}$	1 1 1 1 1

	Persamaan garis lurus $= y - 2 = \frac{3}{2} (x - 1)$ $2y = 3x + 1$ (c) Andaikan $L = (x,y)$ $LA = 2LB$ $\sqrt{[(x - (-3))]^2 + (y - 5)^2} = 2\sqrt{(x - 6)^2 + [y - (-1)]^2} \quad [1 \text{ m}]$ $(x + 3)^2 + (y - 5)^2 = 4[(x - 6)^2 + (y + 1)^2]$ $x^2 + 6x + 9 + y^2 - 10y + 25 = 4x^2 - 48x + 144 + 4y^2 + 8y + 4$ $3x^2 + 3y^2 - 54x + 18y + 144 = 0$	1 1 1 1 1
11	(a) $y = x^2 - 9$ $\frac{dy}{dx} = 2x$ Kecerunan garis lurus $PQ = 2$ $2x = 2$ $x = 1$ Apabila $x = 1$, $y = 1^2 - 9 = -8$ Koordinat titik K ialah $(1, -8)$ (b) Pada paksi-x, $y = 0$ $x^2 - 9 = 0$ $x^2 = 9$ $x = \pm 3$ Lengkung itu memotong paksi-x di titik $(-3,0)$ dan titik $(3,0)$. Luas rantau berlorek = Luas Δ - Luas rantau yang dibatasi oleh lengkung $= \frac{1}{2} (5 - 1)(8) - \int_1^3 y \, dx$ $= 16 - \int_1^3 (x^2 - 9) \, dx$ $= 16 - \left[\frac{x^3}{3} - 9x \right]_1^3$ $= 16 - \left \left(\frac{3^3}{3} - 9(3) \right) - \left(\frac{1^3}{3} - 9(1) \right) \right$ $= 16 - \left -\frac{28}{3} \right$	1 1 1 1 1

$$= 16 - \frac{28}{3}$$

$$= 6\frac{2}{3} \text{ unit}^2$$

1

c) Isipadu kisaran = 40π

$$\pi \int_h^0 x^2 dy = 40\pi$$

$$\pi \int_h^0 (y + 9) dy = 40\pi$$

$$\left[\frac{y^2}{2} + 9y \right]_h^0 = 40$$

$$0 - \left(\frac{h^2}{2} + 9h \right) = 40$$

$$h^2 + 18h + 80 = 0$$

$$(h + 10)(h + 8) = 0$$

$$h = -10 \text{ atau } h = -8 \text{ (ditolak)}$$

$$\text{Maka, } h = -10$$

1

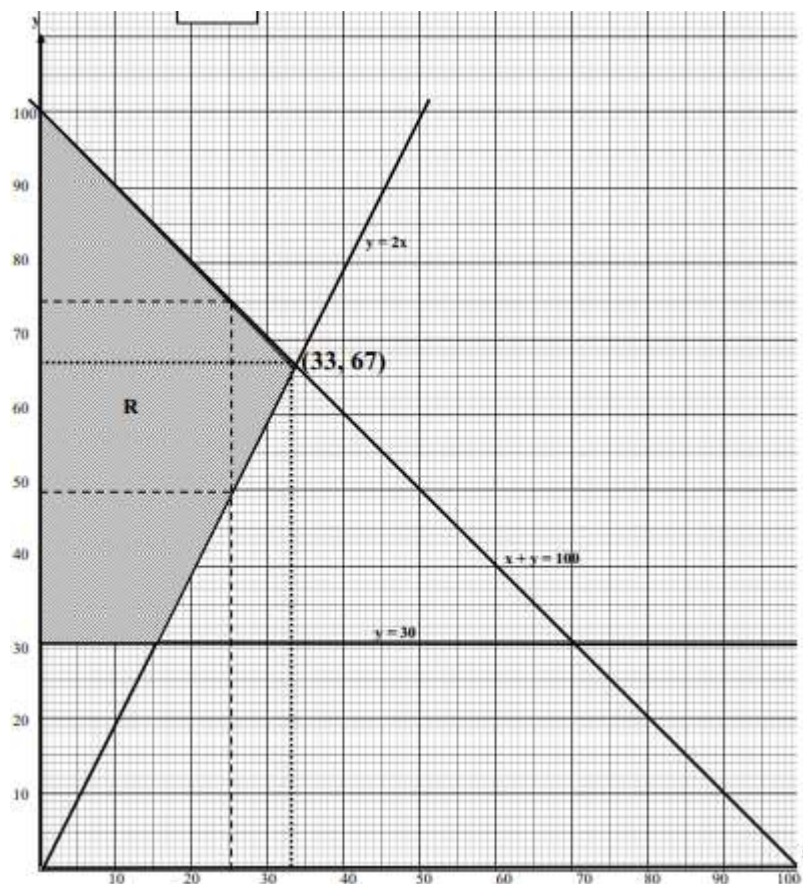
1

1

1

- (a) $y \geq 30$
 $x + y \leq 100$
 $y \geq 2x$

(b)



Melukis dengan betul sekurang-kurangnya satu garis lurus
 Melukis dengan betul semua garis lurus
 Melorek rantau dengan betul

- (c) (i) $50 \leq y \leq 75$
 Gunakan $120x + 80y$ untuk sebarang titik dalam rantau
 Titik maksimum (33, 67)
 RM 9320
 TOTAL

1
1
1

1
1
1

1
1
1
1

