MODUL PINTAS
TINGKATAN 5

MATEMATIK TAMBAHAN
Kertas 2

3472/2

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit
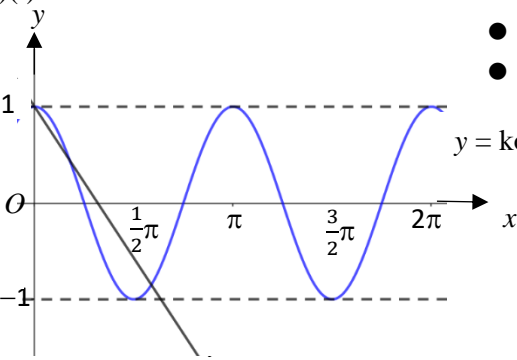
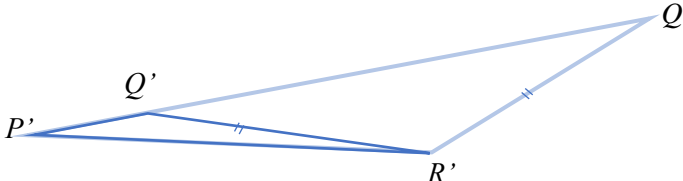# PERATURAN PEMARKAHAN MATEMATIK TAMBAHAN K2 3472/2

NO.	PENYELESAIAN	MARKAH		
1.	(a) (i) $3\left(i + 4j\right)$ ATAU $3\binom{1}{4}$	K1		
	$3\underline{i} + 12\underline{j}$ ATAU $\binom{3}{12}$	N1		
	(3, 12)			
	(ii) $\overrightarrow{OS} = \overrightarrow{OP} + \frac{3}{4}\overrightarrow{PQ}$ ATAU $\overrightarrow{OS} = \overrightarrow{OQ} + \frac{1}{4}\overrightarrow{QP}$	K1		
	$= 6\underline{i} + \frac{3}{4}\left(-6\underline{i} + \left(3\underline{i} + 12\underline{j}\right)\right)$ ATAU		4	
	$= 3\underline{i} + 12\underline{j} + \frac{1}{4}\left(-3\underline{i} - 12\underline{j} + 6\underline{i}\right)$ ATAU			
	$\binom{6}{0} + \frac{3}{4}\binom{-6+3}{12}$ ATAU $\binom{3}{12} + \frac{1}{4}\binom{-3+6}{-12}$			
	$\left(\frac{15}{4}, 9\right)$	N1		
	(b) $\left(\frac{15}{4}i + 9j\right) - \left(i + 4j\right)$ ATAU $\binom{\frac{15}{4}}{9} - \binom{1}{4}$	K1		8
	$\frac{11}{4}\underline{i} + 5\underline{j}$ ATAU $\binom{\frac{11}{4}}{5}$			
	$\sqrt{\left(\frac{11}{4}\right)^2 + (5)^2}$	K1		
	$\frac{\sqrt{521}}{4}$		4	
	$\frac{1}{\frac{\sqrt{521}}{4}}\left(\frac{11}{4}\underline{i} + 5\underline{j}\right)$ ATAU $\frac{1}{\frac{\sqrt{521}}{4}}\binom{\frac{11}{4}}{5}$	K1		
	$\frac{11\sqrt{521}}{521}\underline{i} + \frac{20\sqrt{521}}{521}\underline{j}$ ATAU $\frac{4\sqrt{521}}{521}\left(\frac{11}{4}\underline{i} + 5\underline{j}\right)$ ATAU	N1		
	$\binom{\frac{11\sqrt{521}}{521}}{\frac{20\sqrt{521}}{521}}$ ATAU $\frac{4\sqrt{521}}{521}\binom{\frac{11}{4}}{5}$			
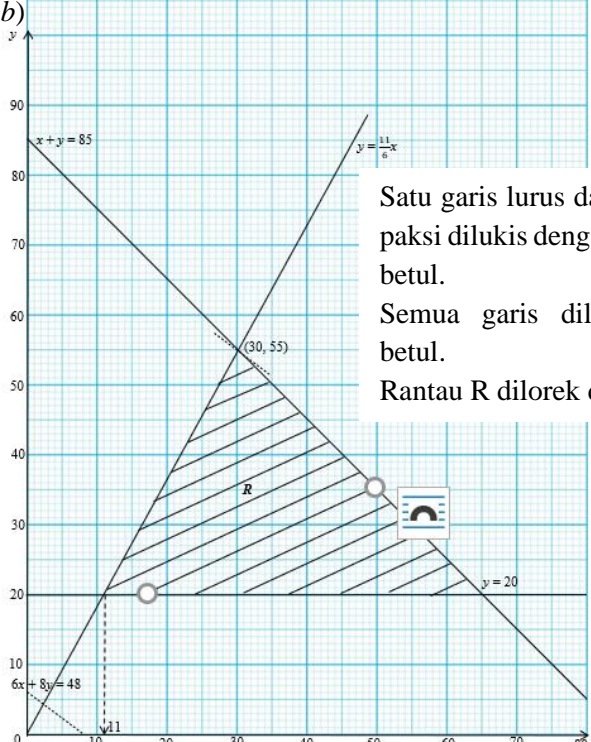
NO.	PENYELESAIAN	MARKAH		
2.	(a) $\frac{1}{2}(5 + \sqrt{3})(2 + \sqrt{27})$	K1		
	$\frac{1}{2}(10 + 2\sqrt{3} + 5\sqrt{27} + \sqrt{81})$	K1	3	
	$\frac{19}{2} + \frac{17}{2}\sqrt{3}$	N1		
	(b) $\frac{1}{2}\log_a 9xy$ ATAU $(x - y)^2 = x^2 + y^2 - 2xy$	K1		7
	$= \frac{1}{2}\log_a(x^2 + y^2 - 2xy)$ ATAU $\log_a(x - y)^2 = \log_a 9xy$	K1		
	$= \frac{1}{2}\log_a(x - y)^2$ ATAU $2\log_a(x - y) = \log_a 9 + \log_a x + \log_a y$	K1	4	
	$= \log_a(x - y)$ ATAU $\log_a(x - y) = \frac{1}{2}\log_a x + \frac{1}{2}\log_a y + \log_a 3$	N1		
3.	$x + y + z = 12$, $x + 3z = 5y$	P1, P1		
	$100z + 10y + x = 3(100x + 10y + z) - 96$	K1		
	$97z = 299x + 20y - 96$ (tertunjuk)			
	Hapus satu pemboleh ubah			
	$(5y - 3z) + y + z = 12$ ATAU cara lain yang setara	K1		
	$2x + 8y = 36$ atau $6y - 2z = 12$ atau $6x + 8z = 60$			7
	$x = \frac{36 - 8y}{2}$ atau $y = \frac{2z + 12}{6}$ atau $z = \frac{60 - 6x}{8}$ ATAU		7	
	$y = \frac{36 - 2x}{8}$ atau $z = \frac{6y - 12}{2}$ atau $x = \frac{60 - 8z}{6}$			
	Hapus dua pemboleh ubah	K1		
	$299(18 - 4y) + 20y - 97(3y - 6) = 96$ atau setara			
	$x = 2$ atau $y = 4$ atau $z = 6$	N1		
	246	N1		
4.	(a) $\ldots, a + d, a + 3d, a + 10d, \ldots$	K1		
	$\frac{a + 3d}{a + d} = \frac{a + 10d}{a + 3d}$	K1		
	$d = -5a$	K1	4	
	$r = \frac{7}{2}$	N1		
	(b) $\frac{n}{2}[2(3) + (n - 1)4] = 55$	K1		7
	$n = 5$			
	$T_5 = 3 + 4(4)$	K1	3	
	$= 19$	N1		

3

NO.	PENYELESAIAN	MARKAH		
5.	(a) $\dfrac{360°}{6} \times \dfrac{3\cdot142}{180}$ $1\cdot047$	N1	1	
	(b) $\angle AOC = 2\left(\dfrac{360}{6}\right)° = 120°$ // $2\cdot095$ rad.	P1		**7**
	$(5)\sin\left(\dfrac{120°}{2}\right)$ atau $(5)(1\cdot047)$ ATAU $5^2 + 5^2 - 2(5)(5)\cos 120°$	K1		
	$6\left[2(5)\sin\left(\dfrac{120°}{2}\right)\right] + 3(5)(1\cdot047)$ ATAU $6 \times \sqrt{5^2 + 5^2 - 2(5)(5)\cos 120°} + 3(5)(1\cdot047)$ $= 67\cdot67$ cm	K1	4	
	$67\cdot67$ cm dan cukup $67\cdot67$ cm *and* en*ough*	N1		
	(c) $3\left[\dfrac{1}{2}(5)^2\left(1\cdot047 - \sin\left(\dfrac{360}{6}\right)°\right)\right]$ $6\cdot787$ cm^2	K1 N1	2	
6.	(a) $x = 4 - x$ $x = 2$ $\therefore y = -\sqrt{2}$	K1 N1	2	
	(b) $\displaystyle\int_{-2}^{-\sqrt{2}} 4 - y^2\, dy + \int_{-\sqrt{2}}^{0} y^2\, dy$ $= \left[4y - \dfrac{y^3}{3}\right]_{-2}^{-\sqrt{2}} + \left[\dfrac{y^3}{3}\right]_{-\sqrt{2}}^{0}$ $= \left[4(-\sqrt{2}) - \left(\dfrac{(-\sqrt{2})^3}{3}\right) - \left(4(-2) - \dfrac{(-2)^3}{3}\right)\right] + \left[0 - \left(\dfrac{(-\sqrt{2})^3}{3}\right)\right]$ $= \dfrac{16 - 8\sqrt{2}}{3} = 1\cdot562$	K1 K1 N1	3	**8**
	(c) $\pi\left[4x - \dfrac{x^2}{2}\right]_{2}^{4} + \pi\left[\dfrac{x^2}{2}\right]_{0}^{2}$ $= \pi\left[\left(4(4) - \dfrac{4^2}{2}\right) - \left(4(2) - \dfrac{2^2}{2}\right)\right] + \pi\left[\dfrac{2^2}{2} - 0\right]$ $= 4\pi$ unit^3	K1 K1 N1	3	

NO.	PENYELESAIAN		MARKAH	
7.	(a) $$\dfrac{1 - \dfrac{\sin^2 x}{\text{kos}^2 x}}{1 + \dfrac{\sin^2 x}{\text{kos}^2 x}}$$	K1	2	
	$$\dfrac{\text{kos}^2 x - \sin^2 x}{\text{kos}^2 x + \sin^2 x} = \text{kos}2x$$	N1		
	(b)(i) ● bentuk kos x ● 2 kitaran dalam 2π ● $-1 \le y \le 1$ $y = \text{kos } 2x$	P1 P1 P1 4	6	
	(ii) $y = 1 - x$, 3 penyelesaian	N1		
8.	(a)(i) $np = 630$ atau $\sqrt{npq} = 21$	K1	5	
	$\sqrt{630q} = 21$ Peratus guru perempuan $= 70\%$ % *of female teachers* $= 70\%$	K1 N1		
	(ii) $1 - \left[{}^{10}C_0(0.3)^0(0.7)^{10} + {}^{10}C_1(0.3)^1(0.7)^9 \right.$ $\left. + {}^{10}C_2(0.3)^2(0.7)^8 \right]$ $= 0{\cdot}6172$	K1 N1		
	(b)(i) $P\left(Z > \dfrac{35 - 38}{5} \right)$ $P(Z > -0{\cdot}6)$ $= 0{\cdot}7257$	K1 N1	5	10
	(ii) $P\left(Z < \dfrac{n - 38}{5} \right) = 0{\cdot}2$ $\dfrac{n - 38}{5} = -0{\cdot}842$ $n \approx 33.79$	K1 K1 N1		

NO	PENYELESAIAN	MARKAH		
9.	(a)			

$\sqrt{y}$	1·02	1·16	1·44	1·72	2	2·14

NO	PENYELESAIAN	MARKAH		
9.	**(a)** $\sqrt{y}$: 1·02, 1·16, 1·44, 1·72, 2, 2·14	N1	4	
	Plot paksi-$\sqrt{y}$ melawan paksi-x dengan skala seragam yang betul dan satu titik diplot dengan betul.	K1		
	Keenam-enam titik diplot dengan betul.	N1		
	Garis lurus penyuaian terbaik.	N1		
	(b)(i) $\sqrt{y} = \frac{6}{p}x - \frac{2}{q}$	P1		**10**
	$\frac{6}{p} = \frac{2\cdot14^* - 0\cdot6^*}{5\cdot5^* - 0^*}$ * bagi mana-mana dua pasangan titik di atas garis penyuaian terbaik	K1	6	
	$p = 21\cdot05 \sim 21\cdot82$	N1		
	$-\frac{2}{q} = 0\cdot6^*$ * merujuk pintasan-y dalam graf	K1		
	$q = -3\cdot08 \sim -3\cdot64$	N1		
	(ii) 2·69	N1		
10.	**(a)** $\frac{5-(-4)}{p-(-2)} = -\frac{1}{\frac{3-(-5)}{(-1)-5}}$ atau	K1	2	
	$\sqrt{[p-(-1)]^2 + (5-3)^2} = \sqrt{(p-5)^2 + [5-(-5)]^2}$	N1		
	$p = 10$			
	(b) $y - (-4) = \frac{3}{4}(x - (-2))$	K1	3	
	$y = \frac{3}{4}x - \frac{5}{2}$	N1		**10**
	$q = -1$	N1		
	(c) $\frac{1}{2}|(-1)(-4) + (-2)(-5) + 5(5) + 10(3) - 3(-2) - (-4)(5) - (-5)(10) - 5(-1)|$	K1	2	
	75	N1		
	(d) $\sqrt{(x-(-1))^2 + (y-3)^2}$ atau $\sqrt{(x-5)^2 + (y-(-5))^2}$	P1	3	
	$\sqrt{(x-(-1))^2 + (y-3)^2} = 3\sqrt{(x-5)^2 + (y-(-5))^2}$	K1		
	$2x^2 + 2y^2 - 23x + 24y + 110 = 0$	N1		
11.	**(a)(i)** tidak tertakrif // tiada jawapan *undefined // no solution*	N1		
	(ii)	N1	4	**10**
	(iii) -16	N1		

(ii) Table 1:

x	$-0\cdot1$	$-0\cdot01$	$-0\cdot001$	$-0\cdot0001$	0
$f(x)$	$-15\cdot9750$	$-15\cdot9975$	$-15\cdot9997$	$-16\cdot0000$	-

(ii) Table 2:

x	$0\cdot1$	$0\cdot01$	$0\cdot001$	$0\cdot0001$	0
$f(x)$	$-16\cdot0250$	$-16\cdot0025$	$-16\cdot0002$	$-16\cdot0000$	-

SS-1 jika nilai dalam jadual tidak tepat kepada 4 tempat perpuluhan

NO	PENYELESAIAN	MARKAH	
	(b) $\quad \frac{dy}{dx} = (2)(x+3) + 2x$	K1	
	$\qquad = 4x + 6$	N1	
	$\frac{d^2y}{dx^2} = 4$	N1	
	$\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 4 + x(4x+6) + 2x(x+3)$		6
	$\qquad\qquad = 6x^2 + 12x + 4$	N1	
	$6x^2 + 12x + 4 = -2$		
	$x^2 + 2x + 1 = 0$		
	$(x+1)(x+1) = 0$	K1	
	$x = -1$	N1	
12.	(a) $\quad \frac{1}{2}(8 \cdot 2 + 5 \cdot 32 + 3 \cdot 6)$	P1	
	$\sqrt{(8\cdot56)(8\cdot56 - 8\cdot2)(8\cdot56 - 5\cdot32)(8\cdot56 - 3\cdot6)}$	K1	3
	$7\cdot037$	N1	
	SS-1 jika mencari luas dengan sudut P, Q atau R.		
	(b) $\quad kos P = \frac{8\cdot2^2 + 5\cdot32^2 - 3\cdot6^2}{2(8\cdot2)(5\cdot32)}$ ATAU $\frac{1}{2}(8\cdot2)(5\cdot32)\sin P = 7\cdot037$		
	atau setara	K1	2
	$18.82°$	N1	
	(c)(i) $\angle Q'R'P'$ mesti sudut tirus	N1	10
	(ii) $\quad \frac{\sin Q'}{5.32} = \frac{\sin 18.82°}{3.6}$ atau setara	K1	5
	$151.53°$	N1	
	(iii) $\quad \sin 9.65° = \frac{t}{3.6}$	K1	
	(t boleh diganti oleh mana-mana simbol atau huruf)		
	$0\cdot6035$	N1	
13.	(a) $\quad$ I $\quad : x + y \le 85$	N1	
	$\qquad$ II $\quad : y \ge 20$	N1	3
	$\qquad$ III $\quad : y \le \frac{11}{6}x$	N1	

NO	PENYELESAIAN	MARKAH	
	(b) Satu garis lurus dan kedua-dua paksi dilukis dengan skala yang betul. K1 Semua garis dilukis dengan betul. N1 Rantau R dilorek dengan tepat. N1	3	**10**
	(c)(i) Bilangan minimum murid lelaki = 11 *Minimum number of boys* = 11 N1 *(ii)* Titik maksimum = (30, 55) N1 Kos maksimum / *Maximum cost* = 600(30) + 800(55) K1 = RM62 000 N1	4	
14.	*(a)* $a = -2$ N1	1	**10**
	(b) Bila zarah berhenti, $v = 0$ $4 - 2t = 0$ K1 $t = 2$ $s = 4t - t^2$ K1 bila $t = 2$, $s = 4(2) - (2)^2$ $s = 4$ Di *B*, $s = 3$, $3 = 4t - t^2$ K1 $(t - 1)(t - 3) = 0$ bila $t = 1$, $v = 4 - 2(1)$ K1 $v = 2$ N1	5	
	(c) Di *A*, $s = -12$ $-12 = 4t - t^2$ K1 $(t - 6)(t + 2) = 0$ $t = 6$ N1	2	
	(d) Jumlah jarak / *Total distance* = 4 + 4 + 12 K1 = 20 N1	2	

NO		PENYELESAIAN	MARKAH		
15.	(a)	$\dfrac{32}{P_{2019}} \times 100 = 128$ RM25	K1 N1	2	
	(b)	$\dfrac{(128\times30)+(10\times h)+(135\times40)+(133\times20)}{100}$ $\dfrac{(128\times30)+(10\times h)+(135\times40)+(133\times20)}{100} = 128.5$ $h = 95$	P1 K1 N1	3	10
	(c)(i)	$95 \times \dfrac{112}{100}$ atau $135 \times \dfrac{90}{100}$ ATAU $\dfrac{(100\times30)+(112\times10)+(90\times40)+(100\times20)}{100}$ $\dfrac{(128\times30)+(106.4\times10)+(121.5\times40)+(133\times20)}{100}$ ATAU $128.5 \times \dfrac{97.2}{100}$ 124.24 ATAU 124.90	K1 K1 N1	5	
	(ii)	$\dfrac{P_{2025}}{116} \times 100 = 124.24^{*}$ (*Jawapan daripada (b)(i)) RM144.12 ATAU RM144.88	K1 N1		

TAMAT PERATURAN PEMARKAHAN

Graf 9(a)