



**MODUL PINTAS 2024**  
**TINGKATAN 5**  
**MATEMATIK TAMBAHAN**  
**Kertas 2**

**3472/2**

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

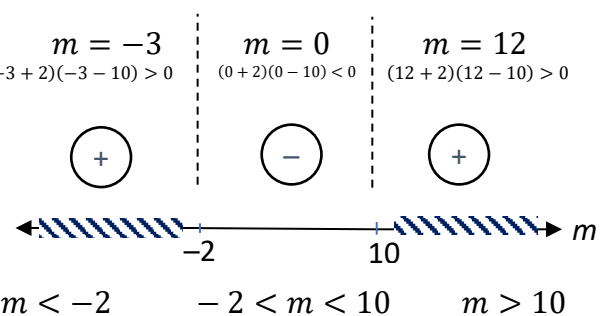
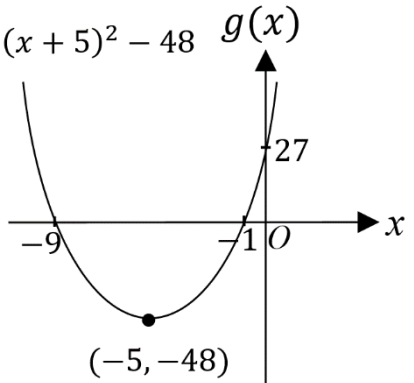
**Dua jam tiga puluh minit**

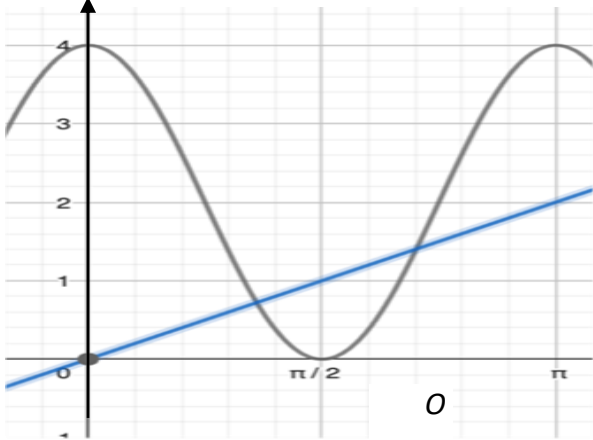
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**PERATURAN PEMARKAHAN**  
**MATEMATIK TAMBAHAN K2**  
**3472/2**

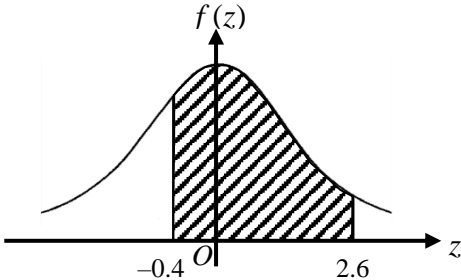
NO SOALAN	JAWAPAN		SUB-MARKAH	MARKAH
<b>BAHAGIAN A</b>				
1	$x^2 + y^2 = 720$ @ $4x + 2y = 120$ $y = 60 - 2x$ $x^2 + (60 - 2x)^2 = 720$ Selesaikan *persamaan kuadratik, $x^2 - 48x + 576 = 0$ $(x - 24)^2 = 0$ @ Guna formula $x = 24$ $y = 12$		P1 P1 K1 K1 N1 N1	6
				<b>6</b>
2	a	$\frac{\log_{\sqrt{x}}x^8}{\log_{\sqrt{x}}9}$ @ $\frac{\log_y y^7}{\log_y 9}$ $\frac{16 \log_{\sqrt{x}}\sqrt{x}}{\log_{\sqrt{x}}9}$ @ $\frac{7 \log_y y}{\log_y 9}$ $\frac{16}{s} + \frac{7}{2t}$	K1 K1 N1	3
	b	$\log_{10} 1.043^q > \log_{10} 7$ $q > \frac{\log_{10} 7}{\log_{10} 1.043}$ 47 tahun	K1 K1 N1	3
				<b>6</b>
3	a	(i) $f^{-1}(x)$ wujud kerana $f(x)$ ialah fungsi satu kepada satu. <i><math>f^{-1}(x)</math> exists because <math>f(x)</math> is a one-to-one function.</i>	P1	3
		(ii) $y^2 = 2x - 9$ $f^{-1}(x) = \frac{x^2+9}{2}, x \geq 0$	K1 N1	
	b	(i) $g(y) = 3\left(\frac{2}{y}\right)$ $g(x) = \frac{6}{x}, x \neq 0$	K1 N1	

NO SOALAN		JAWAPAN	SUB-MARKAH	MARKAH
	(ii)	$g^2(x) = \frac{6}{x}$ dan $g^3(x) = \frac{6}{x}$ dan $g^4(x) = \frac{6}{x}$ $2n + 1$ adalah sentiasa ganjil, $n=1,2,3,\dots$ $g(x) = \frac{6}{x}, x \neq 0$ . $2n + 1$ is always odd, $n=1,2,3,\dots$ $g^{2n+1}(x) = \frac{6}{x}, x \neq 0$ .	K1 N1	4
				7
4	a	$(m - 4)^2 - 4(1)(9) > 0$ $(m + 2)(m - 10) > 0$  Titik Ujian: $m = -3$ $(-3 + 2)(-3 - 10) > 0$ $m = 0$ $(0 + 2)(0 - 10) < 0$ $m = 12$ $(12 + 2)(12 - 10) > 0$  $m < -2$ $-2 < m < 10$ $m > 10$  Nota : Terima semua titik ujian yang betul dalam julat yang sepadan  $m < -2, m > 10$	K1  K1  N1	3
	b	(i) $g(x) = 3(x + 5)^2 - 48$ $g(x)$  Bentuk $\cup$ Titik minimum $(-5, -48)$ , pintasan $x = -1, -9$ dan pintasan- $y = 27$ dilabel pada graf.  Nota: Kedua-dua paksi- $x$ dan paksi- $y$ mesti dilukis dengan pembaris.	P1  P1	
	(ii)	$p > 5$ $q < -48$	P1 P1	4
				7

NO SOALAN		JAWAPAN	SUB-MARKAH	MARKAH
5	a	 <p>Bentuk graf cos sekurang-kurangnya 1 kitaran Bilangan kitaran dan amplitude yang betul Anjakan graf 2 unit ke atas</p> <p>Lukis garis <math>y = \frac{2x}{\pi}</math> dengan betul</p> <p>Bilangan penyelesaian = 2</p>	P1 P1 P1 K1 N1	5
	b	$2(\cos^2 x - \sin^2 x - 2 \cos^2 x) = 0$ $\sin x (2 \sin x - 1) = 0$ <p>Sudut rujukan = <math>0^\circ, 30^\circ</math> <math>0^\circ, 30^\circ, 150^\circ, 180^\circ, 360^\circ</math></p>	K1 K1 N1 N1	4
				<b>9</b>
6	a	$y = \frac{x^3}{3} + 4x + \frac{4x^{-1}}{-1} + c$ $1 = \frac{1^3}{3} + 4(1) - \frac{4}{1} + c$ $y = \frac{x^3}{3} + 4x - \frac{4}{x} + \frac{2}{3}$	K1 K1 N1	3
	b	$\left[-\frac{2x^2}{2} + 3x\right]_{-2}^0 @ \frac{1}{2}(3+7)(2) @ \left[-\frac{x^4}{4} - \frac{x^3}{3} + 3x\right]_{-2}^0$ $0 - \left[-\frac{2(-2)^2}{2} + 3(-2)\right] @ 0 - \left[-\frac{(-2)^4}{4} - \frac{(-2)^3}{3} + 3(-2)\right]$ $10 - \frac{22}{3}$ $\frac{8}{3}$	K1 K1 K1 N1	4
				<b>7</b>

NO SOALAN		JAWAPAN	SUB-MARKAH	MARKAH
7	a	$\frac{-5\hat{i} + 5\hat{j}}{\sqrt{(-5)^2 + 5^2}}$ $-\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j}$	K1 N1	2
	b	(i) $\overrightarrow{BD} = \overrightarrow{BA} + \overrightarrow{AD} @ \overrightarrow{EC} = \overrightarrow{ED} + \overrightarrow{DC} @$ setara $\overrightarrow{BD} = -20x + 32y$	P1 N1	
		(ii) $\overrightarrow{EC} = 25x$	N1	
		(iii) $\overrightarrow{BD} = \lambda\overrightarrow{FD}$ $\overrightarrow{BD} = \frac{4}{3}(-15x + 24y) @ -20 = -15\lambda \text{ dan } 32 = 24\lambda$ $\overrightarrow{BD} = \frac{4}{3}\overrightarrow{FD} @ \overrightarrow{BD} = 4\overrightarrow{BF} @$ setara dan B, F dan D segaris	P1 K1 N1	
				6 <b>8</b>

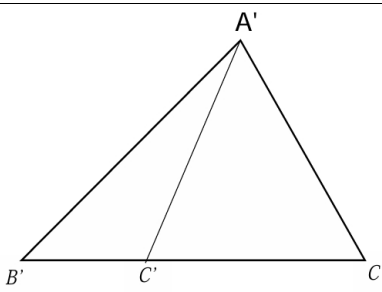
<b>BAHAGIAN B</b>			
8	a	$(2x + 6)^6(3) + 3x[12(2x + 6)^5]$ $6(2x + 6)^5(7x + 3)$	K1 N1 2
	b	$\delta y = 5(x + \delta x)^2 - 5x^2$ @ $\delta y = 10x + 5(\delta x)$ $\frac{dy}{dx} = \lim_{\delta x \rightarrow 0} \frac{10x + 5(\delta x) - 10x}{\delta x} = 5$ dan $10x + 5(0)$ $10x$	K1 K1 N1 3
	c	$\frac{2(x - 2) - 1(2x - 8)}{(x - 2)^2}$ $3h = \frac{4}{(x - 2)^2}$ $h = \frac{1}{12}$ $m_2 \left(\frac{1}{4}\right) = -1$ $m_2 = -4$	K1 K1 N1 K1 N1 5
			<b>10</b>
9	a	$\sqrt{(x - (-4))^2 + (y - 2)^2} = \sqrt{((-4) - (-1))^2 + (2 - (-1))^2}$ $x^2 + y^2 + 8x - 4y + 2 = 0$	P1 N1 2
	b	$h = \frac{1(-4) + 2(11)}{1 + 2}$ @ $-2 = \frac{1(2) + 2k}{1 + 2}$ $h = 6$ @ $k = -4$ $h = 6$ dan $k = -4$	K1 N1 N1 3
	c	$\frac{1}{2}  [6(-1) + (-1)(3) + (t)(10)] - [10(-1) + (-1)(t) + 3(6)]  = 30$ $7, -\frac{43}{11}$	K1 N1 2
	d	$m = \frac{10 - 2}{6 - (-4)}$ dan $\frac{4}{5} \times m_2 = -1$ $y - 2 = -\frac{5}{4}(x - 8)$ $y = -\frac{5}{4}x + 12$	K1 K1 N1 3
			<b>10</b>

10	a	<table border="1" data-bbox="245 230 995 311"> <tr> <td><math>\frac{1}{y}</math></td> <td>0.385</td> <td>0.294</td> <td>0.179</td> <td>0.159</td> <td>0.070</td> </tr> </table> <p>Rujuk pada graf Skala betul dan memplot satu *titik dengan betul Semua titik diplotkan dengan betul Garis penyuaian terbaik</p>	$\frac{1}{y}$	0.385	0.294	0.179	0.159	0.070	N1  K1 N1 N1	4
$\frac{1}{y}$	0.385	0.294	0.179	0.159	0.070					
	b	<p>(i) <math>\frac{1}{y} = \frac{p}{3}x + 2q</math></p> <p><math>\frac{p}{3} = * m</math></p> <p><math>p = * -0.27 \leftrightarrow -0.23</math></p> <p><math>2q = * c</math></p> <p><math>q = * 0.26 \leftrightarrow 0.28</math></p> <p>(ii) <math>\frac{1}{y} = * 0.225</math></p> <p><math>y = 4.35 \leftrightarrow 4.44</math></p>	P1  K1  N1  K1  N1   N1	6						
				<b>10</b>						
11	a	<p>(i) <math>P(X = 6) = {}^8C_6 \times (0.1)^6 \times (0.9)^2</math> 0.00002268</p> <p>(ii) <math>0.15 &gt; {}^nC_0 \times (0.1)^0 \times (0.9)^{n-0}</math> <math>\log_{10} 0.15 &gt; \log_{10} 0.9^n</math> <math>n=19</math></p>	K1 N1  K1 K1 N1	5						
	b	<p>(i) <math>\sigma_K = \sqrt{400 \times 0.5 \times 0.5} = 10</math> @ <math>\sigma_L = \sqrt{300 \times \frac{2}{3} \times \frac{1}{3}} = 8.165</math> Lengkung A kerana sisihan piawai K lebih besar daripada L.</p> <p>(ii) 12 <math>P\left(\frac{10 - 12}{5} &lt; Z &lt; \frac{25 - 12}{5}\right)</math></p> 	K1  N1  N1 K1  N1	5						
				<b>10</b>						

**BAHAGIAN C**

12	a	(i)	$-t^2 + 5t + 6 > 0$ $0 < t < 6$	K1 N1	5
		(ii)	$-2t + 5 = 0$ $-\left(\frac{5}{2}\right)^2 + 5\left(\frac{5}{2}\right) + 6$ $\frac{49}{4}$	K1 N1	
	b		$(t + 1)(t - 6) = 0$ $t = 6$ $s = -\frac{t^3}{3} + \frac{5t^2}{2} + 6t$ $-\frac{6^3}{3} + \frac{5(6)^2}{2} + 6(6)$ 54	K1 N1 K1 N1 N1	5
					<b>10</b>
13	a		$\frac{95(x)+120(y)}{x+y} = 110$ atau $\frac{95(x)+130(z)}{x+z} = 120$ $\frac{x}{y} = \frac{2}{3}$ atau $\frac{x}{z} = \frac{2}{5}$ $x:y:z = 2:3:5$	K1 K1 N1	3
		b	$\frac{95(2)+120(3)+130(5)}{2+3+5}$ 120	K1 N1	2
	c	$120 = \frac{40.50}{P_{21}} \times 100$ 33.75	K1 N1	2	
	d	$\frac{(120 \times 140)}{100}$ 168 Kenaikan sebanyak 68%	K1 N1 N1	3	
					<b>10</b>



14	a	(i)	$15^2 + 12^2 - 2(15)(12) \cos 80^\circ$ 17.51	K1 N1	5	
		(ii)	55° dilihat $\frac{a}{\sin 45^\circ} = \frac{32}{\sin 55^\circ}$ 15.62	P1 K1 N1		
	b	$\frac{1}{2} \times 15 \times 12 \times \sin 80^\circ$ $\frac{1}{2} \times 15 \times 12 \times \sin 80^\circ = 2 \left( \frac{1}{2} \times b \times b \times \sin 90^\circ \right)$ 9.414	K1 K1 N1	3		
c	 <p>125°</p>		N1  N1	2		
					<b>10</b>	
15	a	(i)	$x \geq \frac{1}{3}y$ or $y \leq 3x$	N1	3	
		(ii)	$3x + 2y \leq 2000$	N1		
	(iii)	$2x + y \geq 600$	N1			
b	<ul style="list-style-type: none"> <li>Lukis dengan betul sekurang-kurangnya satu garis lurus dari *ketaksamaan yang melibatkan <b>x dan y</b> pada paksi-paksi yang bermula dengan asalan.</li> <li>Lukis <b>semua</b> *garis lurus dengan betul dari semua *ketaksamaan yang melibatkan <math>x</math> dan <math>y</math> (terima garisan putus-putus dan garis padu).</li> <li>Rantau dilorek dengan betul.</li> </ul>		K1  N1  N1	3		
c	(i)	120	N1	4		
	(ii)	(400, 400) @ Seen 400 Max Profit = $12(400) + 6(400)$ = RM7200	N1 K1 N1			
					<b>10</b>	

Soalan 10





Soalan 15

