



**MAJLIS PENGETUA-PENGETUA SEKOLAH MALAYSIA  
( CAWANGAN PULAU PINANG )**

**SULIT**

**3472/2**

**MODUL BERFOKUS KBAT SPM**

ANJURAN MPSM CAWANGAN PULAU PINANG

DENGAN KERJASAMA

SEKTOR PENGURUSAN AKADEMIK  
JABATAN PENDIDIKAN PULAU PINANG

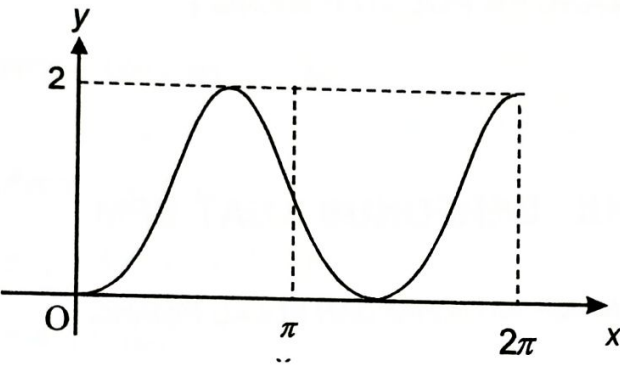
**ADDITIONAL MATHEMATICS 2**

**3472/2**

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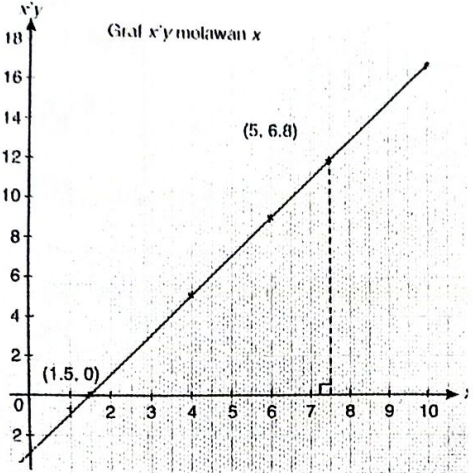
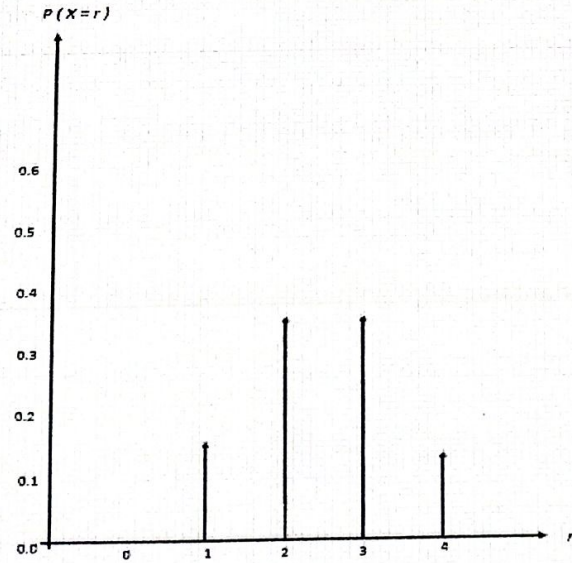
**MARKING SCHEME**

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NO.	SOLUTION	MARKS	TOTAL MARK
<p>1</p> <p>(a)</p>	$5 \left[ \frac{\sin y}{\cos y} \right] - \frac{\cos y}{\sin y} = \frac{1}{\cos y}$ $6 \sin^2 y - \sin y - 1 = 0$ $(2 \sin y - 1)(3 \sin y + 1) = 0$ $\sin y = \frac{1}{2} \quad \text{or} \quad \sin y = -\frac{1}{3} \quad [y = 19.47^\circ]$ $y = 30^\circ, 150^\circ \quad \quad \quad y = 199.47^\circ, 340.53^\circ$ $y = 30^\circ, 150^\circ, 199.47^\circ, 340.53^\circ$ <p>(b)</p> 	<p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>P1 – shape</p> <p>P1 – reflect</p> <p>P1 – shifted</p> <p>P1 – cycle</p>	
<p>2</p> <p>(a)</p> <p>(b)</p> <p>(c)</p>	<p>(i) Use law of polygon <math>\vec{LF} = \vec{LN} + \vec{NF}</math></p> <p>or</p> $\vec{ME} = \frac{1}{3}(\vec{ML} + \vec{LK})$ $\vec{LF} = \frac{2}{3}(2\vec{x} + \vec{y})$ <p>(ii) <math>\vec{ME} = \frac{1}{3}(-\vec{x} + \vec{y})</math></p> <p>Use law of polygon</p> $\vec{LE} = \frac{1}{3}(2\vec{x} + \vec{y})$ $\vec{LF} = 2\vec{LE}$ <p>L is common point, point L, E and F are collinear.</p> <p><math>LN = 4 LM</math></p> <p>Area of <math>\Delta KLN = 24</math></p>	<p>K1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>N1</p>	<p>8</p> <p>7</p>

3	$\frac{2^{2x}}{2^{3y}} = 2^6$ $2x - 3y = 6$ $\log_2(4x - 5) - \frac{\log_2 y^2}{\log_2 4} = 3$ $4x - 5 = 8y$ $y = \frac{2x - 6}{3} \quad \text{or} \quad x = \frac{3y + 6}{2}$ $4x - 5 = 8\left(\frac{2x - 6}{3}\right) \quad \text{or} \quad 4\left(\frac{3y + 6}{2}\right) - 5 = 8y$ $x = \frac{33}{4}$ $y = \frac{7}{2}$	K1			
4	<p>(a) <math>L_1 = 99.5</math> or <math>L_3 = 119.5</math> or <math>f_{Q1} = 17</math> or <math>f_{Q3} = 21</math>  or <math>F_{Q1} = 21</math> or <math>F_{Q3} = 57</math> or <math>C = 10</math></p> $Q_1 = 99.5 + \left(\frac{25 - 21}{17}\right) 10 \quad \text{or} \quad Q_3 = 119.5 + \left(\frac{75 - 57}{21}\right) 10$ $Q_3 - Q_1 = 119.5 + \left(\frac{75 - 57}{21}\right) 10 - 99.5 + \left(\frac{25 - 21}{17}\right) 10$ <p><i>Julat Antara Kuartil = 26.22</i></p> <p>(b) Ya</p> <p>Kerana jika setiap data diganda dua secara seragam julat antara kuartil adalah 2 kali julat antara kuartil yang asal.</p>	P1	K1	K1	N1
		P1	N1		6

5	$x + x + 3 + y + 6 = 23$ $2x + y = 23$ $y = 14 - 2x$ $y^2 + x^2 = (\sqrt{41})^2$ $y^2 + x^2 = 41$ $x^2 + (14 - 2x)^2 = 41$ $5x^2 - 56x + 155 = 0$ $(5x - 31)(x - 5) = 0$ $x = \frac{31}{5} \text{ or } x = 5$ $y = \frac{8}{5} \text{ or } y = 4$	K1 N1 K1 K1 N1 N1	6
6	<p>(a) 0.015, 0.03, 0.06.....</p> $\frac{T_2}{T_1} = \frac{T_3}{T_2} = 2 \text{ terbukti GP}$ <p>Nisbah sepunya = 2</p> <p>(b) <math>T_{10} = 0.015(2^{10-1})</math></p> <p>7.68</p> <p>(c) <math>0.015(2)^{n-1} &gt; 15</math></p> <p><math>n = 11</math></p>	P1 K1 N1 K1 N1 K1 N1	7

<p><b>7</b></p> <p>(a)</p> <table border="1" data-bbox="306 228 933 313"> <tr> <td><math>x</math></td> <td>2.0</td> <td>4.0</td> <td>6.0</td> <td>8.0</td> <td>10.0</td> </tr> <tr> <td><math>x^2y</math></td> <td>1.0</td> <td>5.0</td> <td>9.0</td> <td>13.0</td> <td>17.0</td> </tr> </table> <p>(b)</p>  <p>(c)</p> <p><math>x^2y = hx + k</math></p> <p>(i) <math>y = 0.32</math></p> <p>(ii) <math>h = m = 2</math> <math>1.90 \leq h \leq 2.03</math></p> <p>(iii) <math>k = c = -3</math> <math>-2.95 \leq k \leq -3.05</math></p>	$x$	2.0	4.0	6.0	8.0	10.0	$x^2y$	1.0	5.0	9.0	13.0	17.0		<p>N1</p> <p>K1 Paksi-x melawan <math>x^2y</math></p> <p>N1 Semua titik betul</p> <p>N1 Garis penyuaian terbaik</p> <p>P1 N1</p> <p>K1 N1</p> <p>K1 N1</p>	<p>10</p>
$x$	2.0	4.0	6.0	8.0	10.0										
$x^2y$	1.0	5.0	9.0	13.0	17.0										
<p><b>8</b></p> <p>(a)</p> <p><math>P(X=0) = {}^4C_0(0.60)^0(0.40)^4 = 0.0256</math></p> <p><math>P(X=1) = {}^4C_1(0.60)^1(0.40)^3 = 0.1536</math></p> <p><math>P(X=2) = {}^4C_2(0.60)^2(0.40)^2 = 0.3456</math></p> <p><math>P(X=3) = {}^4C_3(0.60)^3(0.40)^1 = 0.3456</math></p> <p><math>P(X=4) = {}^4C_4(0.60)^4(0.40)^0 = 0.1296</math></p>		<p>P1 Use <math>{}^nC_r(p)^r(q)^{n-r}</math></p> <p>P1 Correct any three probability</p> <p>P1 Plot <math>P(X=r)</math> against <math>r</math></p> <p>K1 Use <math>r = 0, 1, 2, 3, 4</math></p> <p>N1 Plot the probability in a straight line</p>													



<p>(b) (i)</p>	$\frac{X - 27}{6.4} = 0.85$ $X = 32.44$	<p>P1 K1</p> <p>N1</p>	
	<p>(ii)</p>	<p>K1</p> <p>N1</p>	10
<p>9 (a)</p>	<p>(i)</p> $\frac{dy}{dx} = 2x$ <p>Gradient of PQ = 4</p> <p>Q ( 1, 0)</p> <p>(ii)</p> $\left[ \frac{x^3}{3} \right]_0^2 + \left[ \frac{16x^{-2+1}}{-2+1} \right]_2^k = \frac{20}{3} \quad \text{or} \quad \left[ \frac{x^3}{3} \right]_0^2 + \left[ -\frac{16}{x} \right]_2^k = \frac{20}{3}$ $\frac{8}{3} + \left[ -\frac{16}{k} - (-8) \right] = \frac{20}{3}$ $k = 4$	<p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>	
	<p>(b)</p>	<p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>	10

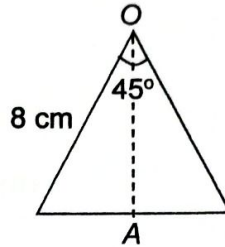
10  
(a)

$$\cos 22.5^\circ = \frac{OA}{8}$$

$$OA = 7.391$$

$$2(7.391)$$

$$14.782$$



K1

K1

N1

(b)

$$\text{Luas jubin} = (14.782)(14.782)$$

$$\text{Luas sektor yang tidak berlorek} = \frac{1}{2}(8^2)\left(45^\circ \times \frac{\pi}{180^\circ}\right) \times 4$$

$$(14.782)(14.782) - \frac{1}{2}(8^2)\left(45^\circ \times \frac{\pi}{180^\circ}\right) \times 4$$

$$117.96$$

K1

K1

K1

N1

(c)

$$8\left(45^\circ \times \frac{\pi}{180^\circ}\right) \text{ or } 8 \times 8$$

$$(8 \times 8) + 8\left(45^\circ \times \frac{\pi}{180^\circ}\right) \times 4$$

$$89.14$$

K1

K1

N1

10





(d)  $s = \int_0^7 (t^2 - 6t + 10) dt$

$s = \left[ \frac{1}{3} t^3 - 3t^2 + 10t \right]_0^7$

$s = \left[ \frac{1}{3} (7)^3 - 3(7)^2 + 10(7) \right] - (0)$

$s = 37\frac{1}{3} m$

K1

K1

N1

13

(a) I  $5x + 10y \leq 800$

II  $y \leq \frac{7}{2}x$

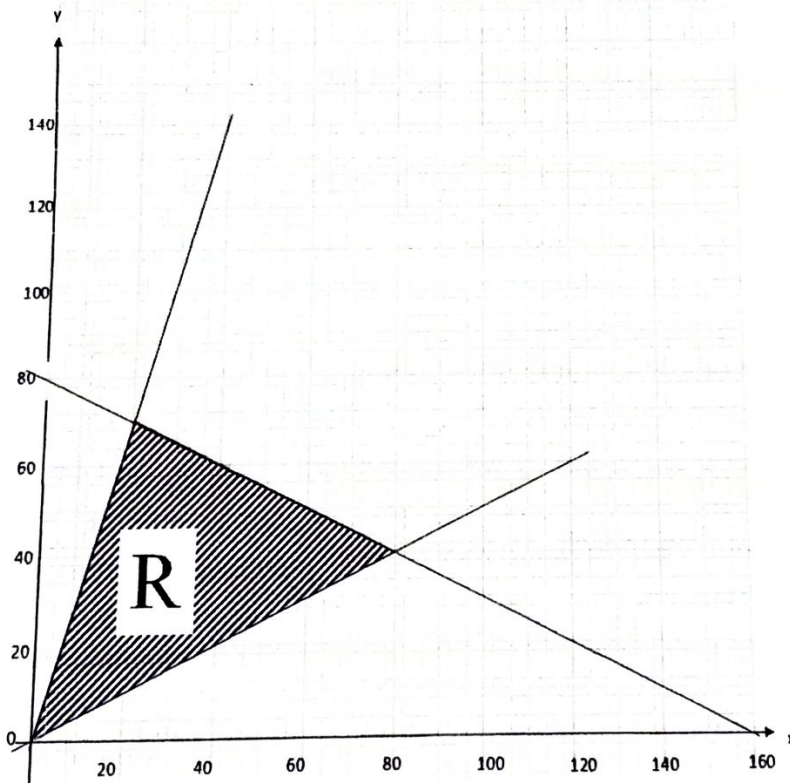
III  $2y \geq x$

N1

N1

N1

(b)



K1

*If two graph lines correctly plotted graph*

N1

*All graph lines correctly plotted*

N1

*Region R*

(c) (i) 60

(ii) Titik maksimum (80, 40)

Keuntungan maksimum :  $3(80) + 5(40)$

RM440

N1

N1

K1

N1

14	<p>(a) <math>16^2 = 13^2 + 11^2 - 2(13)(11) \cos \angle PQR</math>  <math>\angle PQR = 83.17^\circ</math></p> <p>(b) (i) <math>\frac{\sin \angle PSR}{16} = \frac{\sin 60^\circ}{14}</math>  <math>\angle PSR = 81.77^\circ</math> or <math>98.23^\circ</math></p> <p>(ii) <math>\angle SPR = 180 - 81.77 - 60</math>  <math>= 38.23</math>  <math>RS^2 = 14^2 + 16^2 - 2(14)(16) \cos 38.23</math>  <math>RS = 10 \text{ cm}</math></p> <p>(iii) <math>\angle SPR = 180 - 98.23 - 60</math>  <math>= 21.77</math>  Area of <math>\Delta PRS</math>  <math>= \frac{1}{2} (14)(16) \sin 21.77</math>  <math>= 41.54 \text{ cm}^2</math></p>	<p>K1 N1</p> <p>K1 N1</p> <p>K1 K1 N1</p> <p>K1</p> <p>K1 N1</p>	<p>10</p>
15	<p>(a) (i) <math>\frac{3.12}{2.40} \times 100</math>  <math>x = 130</math></p> <p>(ii) <math>y = \text{RM}7.25</math></p> <p>(b) <math>\frac{130(5) + 120(n) + 145(1) + 150(2n)}{5 + n + 1 + 2n} = 137</math>  <math>n = 3</math></p> <p>(c) <math>\frac{9.25}{P_{16}} \times 100 = 137</math>  <math>P_{16} = \text{RM}6.75</math></p> <p>(d) <math>\frac{155}{100} \times \frac{100}{137} \times 100</math>  113.14</p>	<p>K1 N1 N1</p> <p>K2 N1</p> <p>K1 N1</p> <p>K1 N1</p>	<p>10</p>