

SULIT

**PROGRAM GEMPUR KECEMERLANGAN
SIJIL PELAJARAN MALAYSIA 2019
NEGERI PERLIS**

SIJIL PELAJARAN MALAYSIA 2019

3472/2(PP)

MATEMATIK TAMBAHAN

Kertas 2

Peraturan Pemarkahan

Ogos

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 18 halaman bercetak

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(a)	$m - n = 4 \quad \text{or} \quad n = \frac{m-1}{4} \quad \text{or equivalent} \quad \mathbf{P1}$ <p>Solve simultaneous linear equation</p> $m - \left(\frac{m-1}{4}\right) = 4 \quad \text{or equivalent} \quad \mathbf{K1}$ $m = 5 \quad \mathbf{N1} \quad n = 1 \quad \mathbf{N1}$	4	
(b)	$\overrightarrow{PS} = 5p \quad \text{or} \quad \overrightarrow{QR} = 1p \quad \mathbf{P1}$ $\text{Area } \Delta PQR = \frac{1}{5} \times 30 \quad \mathbf{K1}$ $6 \text{ unit}^2 \quad \mathbf{N1}$	3	7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p>2(a)</p> <p>(b)</p>	<p>Differentiate $L = 2\pi r$</p> $\frac{dL}{dr} = 2\pi \quad \text{or} \quad \frac{dL}{dt} = 0.05 \quad (\text{seen}) \quad \mathbf{P1}$ <p>Use chain rule</p> $\frac{dL}{dt} = \frac{dL}{dr} \times \frac{dr}{dt} \quad \text{or} \quad \frac{dr}{dt} = \frac{dL}{dt} \div \frac{dL}{dr}$ $\frac{0.05}{2\pi} \quad \mathbf{K1}$ $\frac{1}{40\pi} \quad \mathbf{N1}$ $\frac{100}{2\pi} \quad (\text{seen}) \quad \mathbf{P1}$ $r_{\text{new}} = \frac{100}{2\pi} + 3 \left(\frac{1}{40\pi} \right) \quad \mathbf{K1}$ $\frac{2003}{40\pi} \quad \mathbf{N1}$	<p>6</p>	<p>6</p>

No.	Solution and Mark Scheme	Sub Marks	Total Marks
3	<p> $8x + 4y = 50$ P1 and $2x^2 + 4xy = 101.5$ P1 $y = \frac{25-4x}{2}$ <u>or</u> $x = \frac{25-2y}{4}$ P1 </p> <p>Eliminate x or y (involving one linear and one non-linear equations in terms of x and y)</p> <p> $2x^2 + 4x\left(\frac{25-4x}{2}\right) = 101.5$ <u>or</u> $2\left(\frac{25-2y}{4}\right)^2 + 4\left(\frac{25-2y}{4}\right)y = 101.5$ K1 </p> <p>Solve the quadratic equation <u>$ax^2 + bx + c = 0$ for $b \neq 0$</u></p> <p>Factorisation</p> <p> $(6x - 29)(2x - 7) = 0$ <u>or</u> $(6y - 17)(2y - 11) = 0$ K1 </p> <p style="text-align: center;">OR</p> <p>Formula</p> <p> $x = \frac{-(-100) \pm \sqrt{(-100)^2 - 4(12)(203)}}{2(12)}$ <u>or</u> $y = \frac{-(-100) \pm \sqrt{(-100)^2 - 4(12)(187)}}{2(12)}$ </p> <p>a, b, c must correct</p> <p> $x = \frac{29}{6}, \frac{7}{2}$ <u>or</u> $y = 2\frac{5}{6}, \frac{11}{2}$ N1 </p> <p> $y = 2\frac{5}{6}, \frac{11}{2}$ <u>or</u> $x = \frac{29}{6}, \frac{7}{2}$ N1 </p>	7	7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
4(a)	<p>Substitute $t = 0$ into $H = 90(0.25)^t$ K1</p> <p>$90(0.25)^0$</p> <p>90 cm N1</p>	2	
(b)	<p>Equate $35 = 90(0.25)^t$ K1</p> <p>Use \log_{10}</p> <p>$\log_{10} \frac{7}{18} = \log_{10} 0.25^t$ K1</p> <p>0.68 saat N1</p>	3	5

No.	Solution and Mark Scheme	Sub Marks	Total Marks
5(a)	$\frac{2+h}{2} = \frac{7}{2} \quad \text{or} \quad \frac{k-6}{2} = 0 \quad \mathbf{K1}$ $h = 5 \quad \mathbf{N1} \quad k = 6 \quad \mathbf{N1}$	3	
(b)	<p>Use $\frac{1}{2} \begin{vmatrix} -3 & 0 & -5 & -3 \\ 6 & -3 & -2 & -6 \end{vmatrix}$</p> <p>Until $\frac{1}{2} () - ()$ K1</p> <p>21 unit² N1</p>	2	
(c)	<p>Find m perpendicular to BC $\frac{-1}{m_{BC}}$ K1</p> $\frac{-1}{\frac{-1-(-6)}{7-2}}$ <p>Use $y - 0 = -1(x - \frac{7}{2})$ K1</p> $y = -x + \frac{7}{2}$ N1	3	8

No.	Solution and Mark Scheme	Sub Marks	Total Marks
6(a)	<p><u>Listing at least 3 terms</u> P1</p> $p_1 = 2(1 + 3) = 8$ $p_2 = 2(3 + 5) = 16$ $P_3 = 2(5 + 7) = 24$ <p><u>Find common different</u> K1</p> $d = 16 - 8 = 24 - 16 = 8$ <p>\therefore <i>Arithmetic Progression</i> N1</p>	3	
(b)	<p><u>Use $T_n = a + (n - 1)d$ or listing method</u> K1</p> $T_{15} = 8 + 14(8)$ <p>120 N1</p>	2	
(c)	<p><u>Find the length or width of the floor to find area</u> K1</p> <p><i>length</i>, $3 + 14(2) = 31$ or <i>width</i>, $1 + 14(2) = 29$</p> <p style="padding-left: 40px;">or 31×29</p> <p style="padding-left: 40px;">899 m² N1</p>	2	7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
7(a)	Differentiate $y = 3x - x^2$ and equate to -1 K1 $3 - 2x = -1$ A(2,2) N1	2	
(b)	Use gradient formula K1 $\frac{k-2}{0-2} = -1$ $k = 4$ N1	2	
(c)	Integrate $\int 3x - x^2 dx$ K1 $\frac{3x^2}{2} - \frac{x^3}{3}$ $\left. \frac{x^3}{3} \right]$ $\frac{7}{6} \text{ unit}^2$ N1	3	
(d)	Integrate $\pi \int (3x - x^2)^2 dx$ K1 $\pi \left[\frac{9x^3}{3} - \frac{6x^4}{4} + \frac{x^5}{5} \right]$ K1 Use limit $\pi \int_0^{*3} \text{into} * \pi \left[\frac{9x^3}{3} - \frac{6x^4}{4} + \frac{x^5}{5} \right]$ N1 $8.1\pi \text{ unit}^3$	3	10

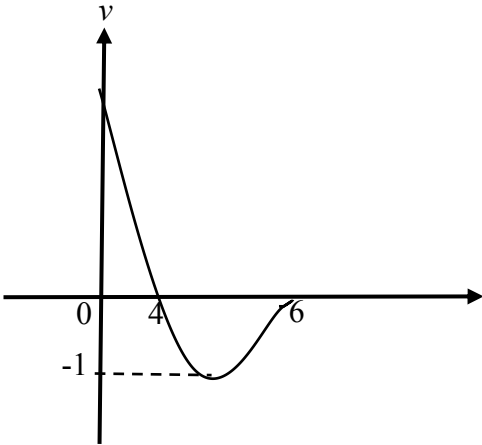
No.	Solution and Mark Scheme	Sub Marks	Total Marks
8 (a)(i)	Use ${}^nC_r (p)^r (q)^{n-r}, p + q = 1$ P1 Substitute $X=3$ into ${}^8C_3 (0.4)^3 (0.6)^5$ K1 0.2787 N1	3	
(ii)	<u>Write $P(X=6) + P(X=7) + P(X=8)$</u> K1 ${}^8C_6 (0.4)^6 (0.6)^2 + {}^8C_7 (0.4)^7 (0.6)^1 + {}^8C_8 (0.4)^8 (0.6)^0$ 0.04981 N1		
(b)(i)	$P\left(z > \frac{80-70}{16}\right)$ or $P(z > 0.625)$ K1 0.266 N1	2	
(ii)	± 0.583 P1 $\frac{m-70}{16} = -0.583$ K1 $m = 60.67$ N1		

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No.	Solution and Mark Scheme							Sub Marks	Total Marks														
<p>9(a)</p>	<table border="1"> <tr> <td>$\log_{10}V$</td> <td>0.700</td> <td>1.00</td> <td>1.176</td> <td>1.301</td> <td>1.398</td> <td>1.477</td> </tr> <tr> <td>$\log_{10}R$</td> <td>1.505</td> <td>1.982</td> <td>2.255</td> <td>2.480</td> <td>2.613</td> <td>2.750</td> </tr> </table>							$\log_{10}V$	0.700	1.00	1.176	1.301	1.398	1.477	$\log_{10}R$	1.505	1.982	2.255	2.480	2.613	2.750	5	
	$\log_{10}V$	0.700	1.00	1.176	1.301	1.398	1.477																
$\log_{10}R$	1.505	1.982	2.255	2.480	2.613	2.750																	
<p>Plot $\log_{10}R$ against $\log_{10}V$ (Correct axes and uniform scales) K1</p> <p>6 *points plotted correctly N1</p> <p>Line of best fit N1</p> <p>(at least *5 points plotted)</p> <p>(Refer graph on page 17)</p>																							
(b)	$\log_{10}R = 2q \log_{10}V + \log_{10}P$ P1							5															
(i)	<p>Use $*m=2q$ or $*c=\log_{10}P$ K1</p> <p>$2q = \frac{2.9-1}{1.6-0.4}$ $\log_{10}P = 0.4$</p>																						
	<p>$q = 7917$ N1 $P = 2.512$ N1</p>																						
(ii)	<p>$V = 12.02$ N1</p>							5															
										5	10												

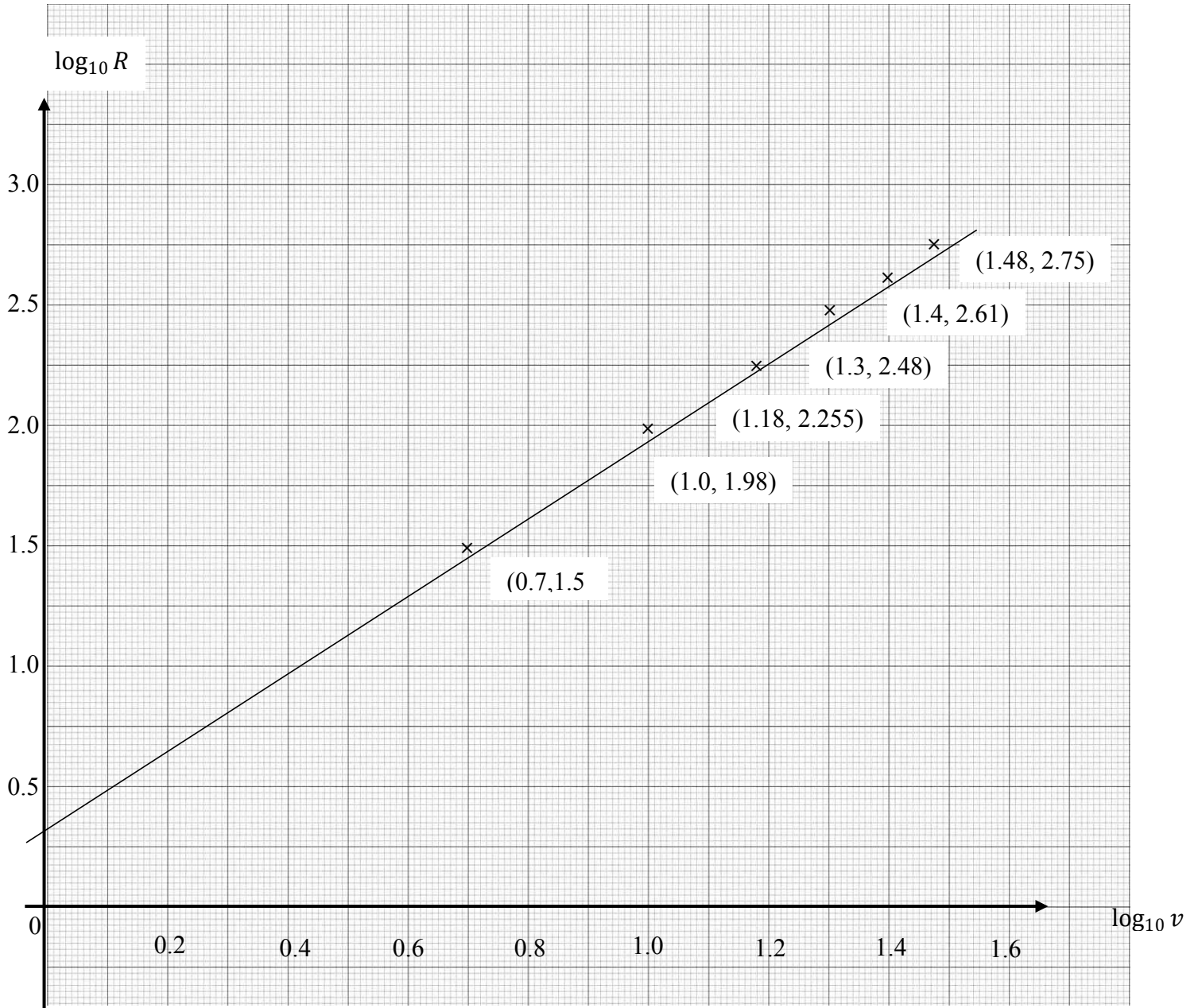
No.	Solution and Mark Scheme	Sub Marks	Total Marks
11(a)	$\tan \angle EDA = \frac{10}{12} \quad \mathbf{K1}$ $0.6947 \quad \mathbf{N1}$	2	
(b)i	$S_{AB} = 6 \times (2 \times 0.6947) \quad \mathbf{K1}$ $8.337 \text{ cm.} \quad \mathbf{N1}$		
ii)	<p>Find ED or BD $\mathbf{K1}$</p> $ED = \sqrt{10^2 + 12^2} = 15.62 \quad \text{or}$ $BD = \frac{6 \times \sin 1.7526}{\sin 0.6947} = 9.218$ <p>Perimeter = $10 + 8.337 + (15.62 - 9.218)$ $\mathbf{K1}$</p> $24.739 \text{ cm}^2 \quad \mathbf{N1}$	5	
(c)	<p><u>Find Area sector OBCD or Area triangle OBD</u> $\mathbf{K1}$</p> $\frac{1}{2} \times 6^2 \times 1.7526 \quad \text{or} \quad \frac{1}{2} \times 6^2 \times \sin 1.7526$ <p>Area segment BCD = $\frac{1}{2} \times 6^2 \times 1.7526 - \frac{1}{2} \times 6^2 \times \sin 1.7526$ $\mathbf{K1}$</p> $13.85 \text{ cm}^2 \quad \mathbf{N1}$	3	10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
13 (a)(i)	$\frac{1}{2} \times 13 \times 15 \times \sin \angle KJM = 90$ K1 $67.3801^\circ // 67.38^\circ$ N1	2	
(ii)	$(KM)^2 = (13)^2 + (15)^2 - 2(13)(15)\cos^* 67.3801^\circ$ K1 $= 15.6205 // 15.62$ N1	2	
(b)i)	$\frac{\sin \angle KLM}{*15.6205} = \frac{\sin 30^\circ}{11}$ K1 $\angle KLM = 134.7632^\circ // 134.76^\circ$ N1 $\angle MKL = 15.2368^\circ // 15.24^\circ$ N1	3	
(ii)	$\frac{1}{2}(11)(*15.6205)\sin^* 15.2368$ K1 $\left[\frac{1}{2}(11)(*15.6205)\sin^* 15.2368 \right] + 90$ K1 $= 112.5786 // 112.58$ N1	3	
		3	10

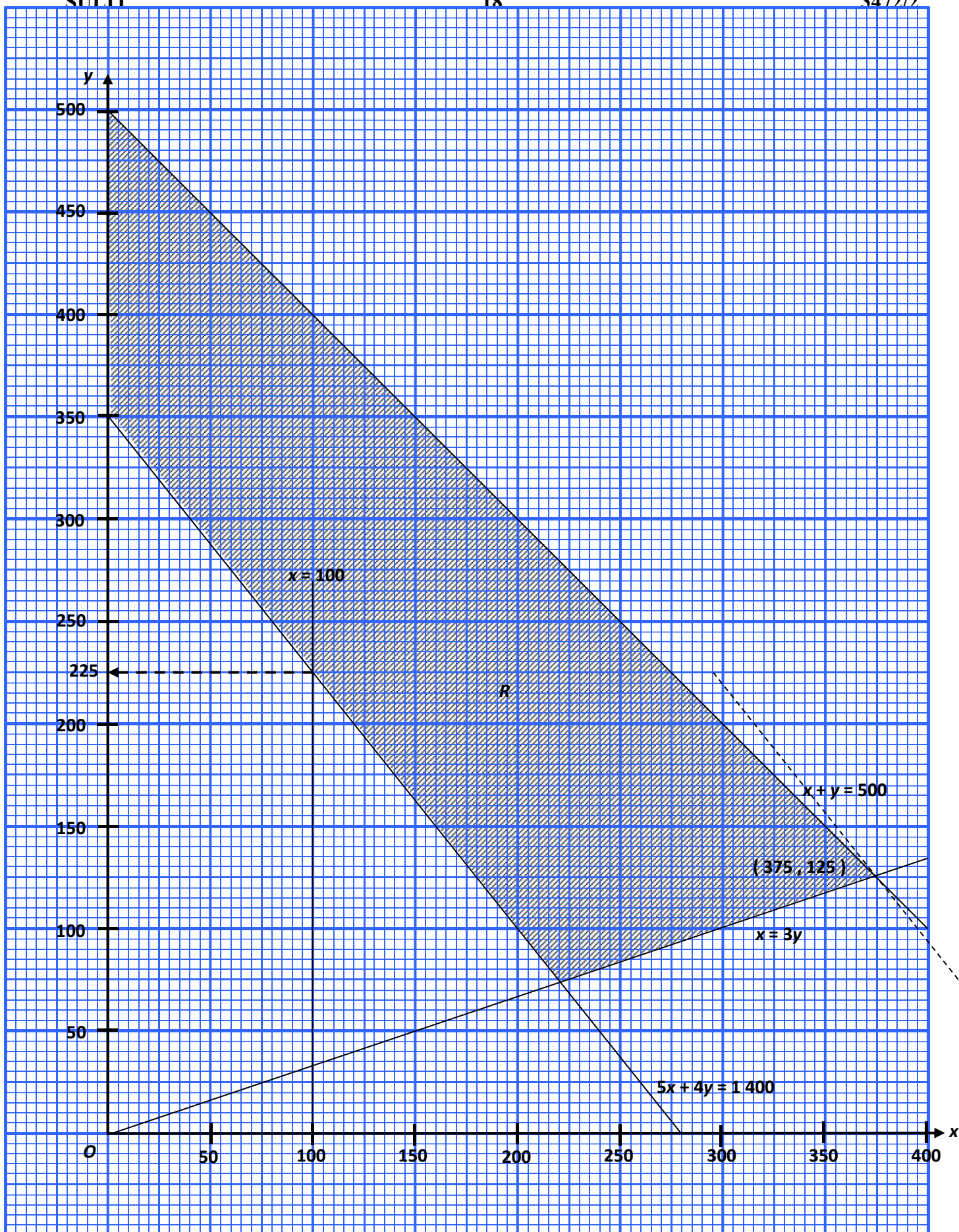
No.	Solution and Mark Scheme	Sub Marks	Total Marks	
<p>14(a)i)</p> <p>ii)</p>	<p>$v = 24 m^{-1}$ N1</p> <p>Use $v < 0$ K1</p> <p>$t^2 - 10t + 24 < 0$</p> <p>$4 < t < 6$ N1</p>	<p>3</p>		
(b)	<p>Differentiate $t^2 - 10t + 24$ and equate to 0 K1</p> <p>$2t - 10 = 0$</p> <p>$t = 5$ N1</p>	<p>2</p>		
(c)	<p>Sketch graph</p> <p>V_{min} OR $t^2 - 10t + 24 = 0$ or implied K1</p> <div style="text-align: center;">  </div> <p style="text-align: right;">N1</p>			
(d)	<p>Integrate $t^2 - 10t + 24$ K1</p> <p>$\frac{t^3}{3} - 5t^2 + 24t$</p> <p>Use limit $S_4 - S_0 + S_6 - S_4$ K1</p> <p>$38\frac{2}{3}m$ N1</p>	<p>5</p>	<table border="1" style="width: 100%; height: 100%;"> <tr> <td style="text-align: center;">10</td> </tr> </table>	10
10				

No.	Solution and Mark Scheme	Sub Marks	Total Marks
15(a)	$125 = \frac{w}{7.00} \times 100$ OR $135 = \frac{x+1.40}{x} \times 100$ K1 $w = 8.75$ N1	2	
(b)	$y = x + 1.40$ or implied P1 $x = 4.00$ N1 $y = 5.40$ N1	3	
(c)(i)	$126.25 = \frac{65.65}{\text{Tahun 2017}} \times 100$ K1 Tahun 2017 = RM52.00 N1	2	
(ii)	$I_Q = 130$ or $I_S = 110$ P1 $126.25 = \frac{125(8)+130(4)+135(k)+110(3)}{8+4+k+3}$ K1 $k = 5$ N1	3	10

Graph for Question 9(b)



Graph for Question 12(b)



PERATURAN PEMARKAHAN TAMAT