

**SULIT**

**PROGRAM GEMPUR KECEMERLANGAN  
SIJIL PELAJARAN MALAYSIA 2021  
NEGERI PERLIS**

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**SIJIL PELAJARAN MALAYSIA 2021  
MATEMATIK TAMBAHAN  
Kertas 2  
Peraturan Pemarkahan  
November**

**3472/2(PP)**

**SET A**

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**UNTUK KEGUNAAN PEMERIKSA SAHAJA**

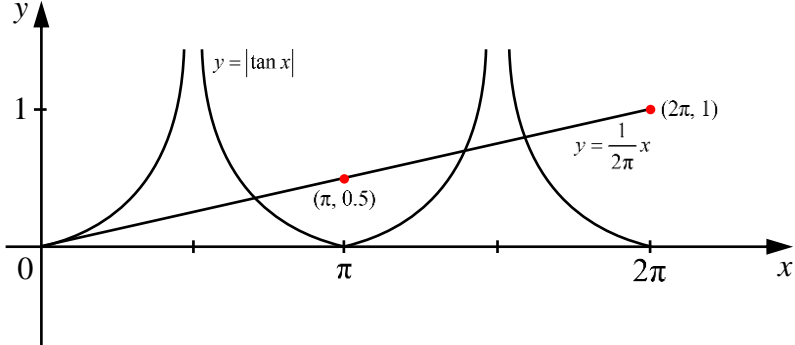
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Peraturan pemarkahan ini mengandungi 18 halaman bercetak

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1	$2x + 2y + 6 = 70 \quad \boxed{\text{P1}} \quad \boxed{\text{P1}} \quad x^2 + (y + 3)^2 = 25^2$ $y = 32 - x \text{ or } x = 32 - y \quad \boxed{\text{P1}}$ $x^2 + (32 - x + 3)^2 = 25^2 \quad \textcircled{\text{K1}}$ <p style="text-align: center;">or</p> $(32 - y)^2 + (y + 3)^2 = 25^2$ <p style="text-align: center;">Solve the quadratic eqn</p> $\underline{ax^2 + bx + c = 0 \text{ for } b \neq 0} \quad \textcircled{\text{K1}}$ <p style="text-align: center;">Factorisation</p> $(x - 20)(x - 15) = 0$ <p style="text-align: center;">or</p> $(y - 17)(y - 12) = 0$ <p style="text-align: center;">Formula</p> $x = \frac{-(-35) \pm \sqrt{(-35)^2 - 4(1)(300)}}{2(1)}$ <p style="text-align: center;">or</p> $y = \frac{-(-29) \pm \sqrt{(-29)^2 - 4(1)(204)}}{2(1)}$ $\boxed{\text{N1}} \quad x = 20, 15 \text{ or } y = 12, 17$ $\textcircled{\text{N1}} \quad y = 12, 17 \text{ or } x = 20, 15$ $\textcircled{\text{N1}} \quad 300$		7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p>2 (a)</p>	$2000 + (n - 1)(-30) = 680 \quad \textcircled{\text{K1}}$ $45 \quad \boxed{\text{N1}}$	2	
<p>(b)</p>	$m + 5k = 7000 \quad \boxed{\text{P1}} \quad \boxed{\text{P1}} \quad \frac{5}{2}[2m + (5 - 1)k] = 29000$ <p><u>Solve simultaneous eqn</u> <math>\textcircled{\text{K1}}</math></p> $3k = 1200 \quad \text{or} \quad 3m = 1500$ $k = 400 \quad \text{or} \quad m = 500 \quad \boxed{\text{N1}}$ $m = 500 \quad \text{or} \quad k = 400 \quad \textcircled{\text{N1}}$	5	7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
3	<p>(a) <u>Write triangle law</u> (K1)</p> $\frac{2}{3}\vec{AC} = \frac{2}{3}(\vec{AB} + \vec{BC})$ <p>or</p> $\vec{BM} = \vec{BC} + \vec{CM}$ $\frac{8}{3}y + 2x \quad \boxed{\text{N1}} \quad (\text{N1}) \quad 2x - \frac{4}{3}y$ <p>(b) <u>Use <math>\vec{BD} = \vec{BC} + \vec{CD}</math></u> (K1)</p> $2hx - \frac{4}{3}hy = 3x - 4ky$ <u>Equate coefficient of x and y</u> (K1) $2h = 3 \quad \text{or} \quad -\frac{4}{3}h = -4k$ $\boxed{\text{N1}} \quad h = \frac{3}{2} \quad \text{or} \quad k = \frac{1}{2}$ $(\text{N1}) \quad k = \frac{1}{2} \quad \text{or} \quad h = \frac{3}{2}$	3	7
		4	

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p>4</p> <p>(a)</p> <p>(b)</p>	<p>Use <math>\cos 2x = 1 + 2\sin^2 x</math> (K1)</p> <p>or</p> <p><math>\sin 2x = 2 \sin x \cos x</math></p> <p>(N1) <math>\tan x</math></p>  <p>Shape of tangent graph (P1)</p> <p>2 cycle for <math>0 \leq x \leq 2\pi</math> (P1)</p> <p>Modulus of tangent graph (P1)</p> <p><math>y = \frac{x}{2\pi}</math> (P1)</p> <p>Sketch the straight line with *gradient or *y-intercept and straight line involves <math>x</math> and <math>y</math> must be correct (K1)</p> <p>Number of solutions = 4 (N1)</p>	<p>2</p> <p>6</p>	<p>8</p>

No.	Solution and Mark Scheme	Sub Marks	Total Marks
5	<p>(a) <math>\frac{\pi}{3}</math> rad @ 1.047 rad <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p>(b) <math>2\left(\frac{3.7}{\tan 30^\circ}\right)</math> or equivalent method <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p style="margin-left: 150px;"><span style="border: 1px solid black; padding: 2px;">N1</span> 12.82 cm</p> <p>(c) <u>Find area of circle</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>      <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span> <u>Find area of a segment</u></p> <p style="margin-left: 50px;"><math>A_1 = 3.142 (3.7)^2</math>      <math>A_2 = \frac{1}{2} (12.82)^2 (1.047 - \sin 60^\circ)</math></p> <p style="margin-left: 150px;"><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span>      <math>A_1 + 3A_2</math></p> <p style="margin-left: 150px;">43.01 + 3(14.87)</p> <p style="margin-left: 100px;"><span style="border: 1px solid black; padding: 2px;">N1</span> 87.62 cm<sup>2</sup></p>	1	
		2	
		4	7

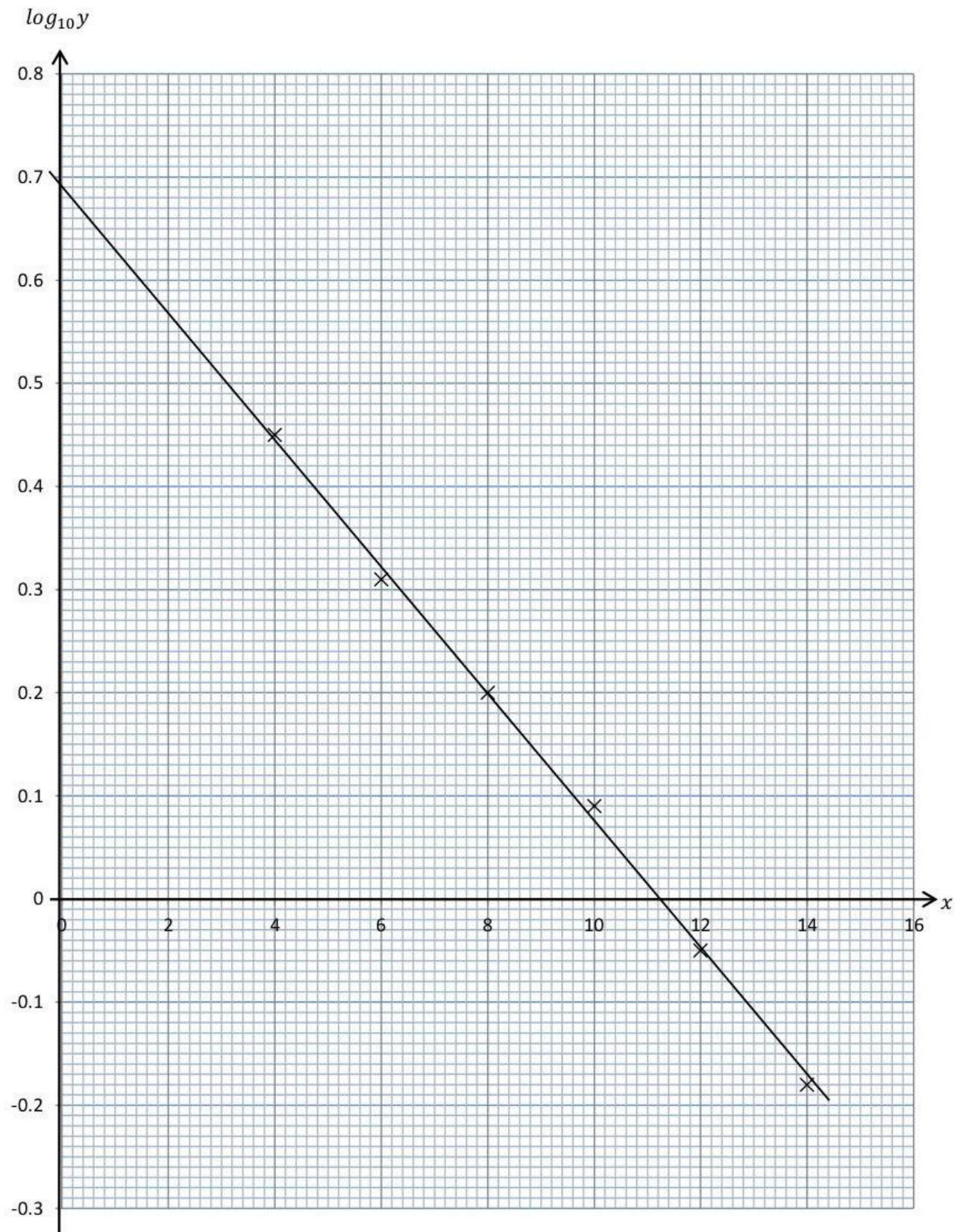
No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p><b>6</b></p> <p>(a)</p>	<p>Write <math>y = a(x - 4)^2 + 12</math> <span style="border: 1px solid black; padding: 2px;">P1</span></p> <p><u>Find a</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><math>0 = a(0 - 4)^2 + 12</math></p> <p style="text-align: center;">or</p> <p><math>0 = a(8 - 4)^2 + 12</math></p> <p><span style="border: 1px solid black; padding: 2px;">N1</span> <math>y = \frac{-3}{4}(x - 4)^2 + 12</math></p> <p>(b)</p> <p><span style="border: 1px solid black; padding: 2px;">P1</span> 6 (seen)</p> <p><math>\frac{-3}{4}(6 - 4)^2 + 12</math> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><span style="border: 1px solid black; padding: 2px;">N1</span> 9 m</p>	<p>3</p> <p>3</p>	<p>6</p>

No.	Solution and Mark Scheme	Sub Marks	Total Marks
7	<p>(a) Use law <math>\text{Log}_a b = \frac{\log_c b}{\log_c a}</math> (K1)</p> $\frac{\log_m 27m^2}{\log_m 5}$ <p>(K1) Use law <math>\log_a bc = \log_a b + \log_a c</math></p> $\log_m 27 + \log_m m^2$ <p>Use law <math>\log_a b^c = c \log_a b</math> (K1)</p> $3 \log_m 3 \text{ or } 2$ <p>(N1) <math>\frac{3x+2}{y}</math></p> <p>(b) <u>Change into index form</u> (K1)</p> $3^x = 7$ <p>(N1) <math>9^x = 49</math></p> $9^{\frac{1}{2}} \times 9^x$ (K1) <p>(N1) 147</p>	4	8
		4	





Graph for Question 8(b)



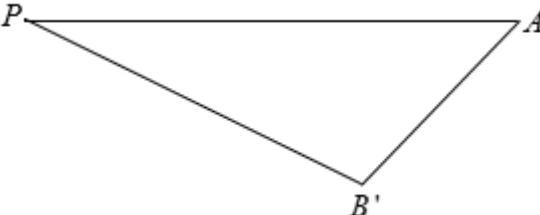
No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p><b>9</b></p> <p>(a)</p>	<p>Integrate <math>\int 2x dx</math> (K1)</p> <p><math>y = x^2 + c</math></p> <p>(K1) Substitute (-1,9) into <math>x^2 + c</math></p> <p>(N1) <math>y = x^2 + 5</math></p>	3	
<p>(b)</p>	<p>Find area of triangle or Integrate <math>(x^2 + 5)dx</math> (K1)</p> <p><math>A_1 = \frac{1}{2} \times 9 \times 9</math> or <math>A_2 = \left[\frac{x^3}{3} + 5x\right]</math></p> <p>(K1) Use limit <math>\int_{-2}^0</math> into <math>\left[\frac{x^3}{3} + 5x\right]</math></p> <p><math>A_1 + A_2</math> (K1) <math>0 - \left(\frac{(-2)^3}{3} + 5(-2)\right)</math></p> <p>40.5 + 12.67</p> <p>(N1) 53.17</p>	4	
<p>(c)</p>	<p>Integrate <math>\pi \int (y - 5)dy</math> (K1)</p> <p><math>\pi \left[\frac{y^2}{2} - 5y\right]</math></p> <p>(K1) Use limit <math>\int_5^9</math> into <math>\pi \left[\frac{y^2}{2} - 5y\right]</math></p> <p><math>\pi \left[\left(\frac{9^2}{2} - 5(9)\right) - \left(\frac{5^2}{2} - 5(5)\right)\right]</math></p> <p>(N1) <math>8\pi</math></p>	3	10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
10	<p>(a) <math>\frac{y-6}{x-8} = \frac{3}{2}</math> (K1)</p> <p>(N1) <math>2y = 3x - 12</math></p> <p>(b) <math>B(4,0)</math> (P1)</p> <p><math>\left(\frac{1(x)+2(0)}{3}, \frac{y(1)+2(2)}{3}\right) = (4,0)</math> (K1)</p> <p>(N1) <math>Q(12, -4)</math></p> <p>(c) <u>Use distance formula for PA or PB</u> (K1) (P1) <math>AP=2PB</math></p> <p><math>PA = \sqrt{(x-0)^2 + (y-2)^2}</math> or <math>PB = \sqrt{(x-4)^2 + (y-0)^2}</math></p> <p>(N1) <math>3x^2 + 3y^2 - 32x + 4y + 60 = 0</math></p> <p><u>Substitute <math>x = 0</math> and use <math>b^2 - 4ac</math></u> (K1)</p> <p><math>4^2 - 4(3)(60) = -704</math></p> <p>(N1) <math>b^2 - 4ac &lt; 0</math> Does not intercept the y-axis</p>	2	3
		5	10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<b>11</b> <b>(a)</b> <b>(i)</b>	$5 = \sqrt{30q} \quad \text{(K1)}$ $q = \frac{5}{6}$ $\text{N1} \quad p = \frac{1}{6}$	2	
	<b>(ii)</b> Use ${}^n C_r \times \left(\frac{1}{6}\right)^r \times \left(\frac{5}{6}\right)^{n-r} \quad \text{(K1)}$ $P(X \leq 2) = P(X = 0) + P(X = 1) + P(X = 2) \quad \text{K1}$ $0.8217 // 0.8218 \quad \text{N1}$	3	
	<b>(b)</b> <b>(i)</b> $P\left(Z > \frac{37.5-35.7}{2.5}\right) \quad \text{(K1)}$ $\text{N1} \quad 0.2358$	2	
	<b>(ii)</b> $z = \pm 0.58 \quad \text{P1}$ $\frac{h-35.7}{2.5} = -0.58 \quad \text{(K1)}$ $\text{N1} \quad h = 34.25$	3	<b>10</b>

No.	Solution and Mark Scheme	Sub Marks	Total Marks
12	<p>(a) Differentiate <math>pt^2 + 13t + 10</math> w.r.t <math>t</math> (K1)</p> $a = 2pt + 13$ <p style="text-align: right;">(K1) <math>2p(1) + 13 = 7</math></p> <p style="text-align: center;">(N1) <math>p = -3</math></p> <p>(b) Use <math>2(-3)t + 13 = 0</math> to find <math>t</math> (K1)</p> $t = \frac{13}{6}$ <p>Substitute <math>t = \frac{13}{6}</math> into <math>-3t^2 + 13t + 10</math> (K1)</p> $v = -3\left(\frac{13}{6}\right)^2 + 13\left(\frac{13}{6}\right) + 10$ <p style="text-align: center;">(N1) <math>24\frac{1}{12} // 24.08</math></p> <p>(c) Integrate <math>-3t^2 + 13t + 10</math> (K1)</p> $\frac{-3t^3}{3} + \frac{13t^2}{2} + 10t$ <p style="text-align: center;">or</p> <p>Use <math>v = 0</math> to find <math>t</math></p> $t = 5$ <p style="text-align: center;">(K1) Use limit <math>\int_0^5</math> or <math>\int_5^6</math> into <math>\frac{-3t^3}{3} + \frac{13t^2}{2} + 10t</math></p> $\left[\frac{-3(5)^3}{3} + \frac{13(5)^2}{2} + 10(5)\right] - \left[\frac{-3(0)^3}{3} + \frac{13(0)^2}{2} + 10(0)\right]$ <p style="text-align: center;">or</p> $\left[\frac{-3(6)^3}{3} + \frac{13(6)^2}{2} + 10(6)\right] - \left[\frac{-3(5)^3}{3} + \frac{13(5)^2}{2} + 10(5)\right]$ <p style="text-align: center;">(K1) <math>87.5 +  -9.5 </math></p> <p style="text-align: center;">(N1) <math>97</math></p>	3	3
		4	10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p><b>13</b></p> <p><b>(a)</b></p> <p><b>(i)</b></p> <p><b>(ii)</b></p> <p><b>(b)</b></p> <p><b>(i)</b></p> <p><b>(ii)</b></p> <p><b>(c)</b></p>	$\frac{12.48}{10.40} \times 100 = m$ <p style="text-align: right;">(K1)</p> <p style="text-align: right;">(N1) 120</p>	2	
	$\frac{p_{13}}{10.40} \times 100 = 140$ <p style="text-align: right;">(K1)</p> <p style="text-align: right;">(N1) RM 14.56</p>		
	$\frac{110(2)+108(2n)+120(4)}{6+2n} = 113.2$ <p style="text-align: right;">(K1)</p> <p style="text-align: right;">(N1) 2</p>	2	
	$\frac{48}{p_{08}} \times 100 = 113.2$ <p style="text-align: right;">(K1)</p> <p style="text-align: right;">(N1) RM42.40</p>	2	
	$\frac{140}{120} \times 100$ <p style="text-align: right;">(K1)</p> <p style="text-align: right;">(N1) 116.67</p>	2	

No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p><b>14</b></p> <p>(a)</p> <p>(i)</p> <p>(ii)</p> <p>(b)</p>	<p>Use <math>6^2 = 14^2 + 12^2 - 2(14)(12)\cos RPQ</math> (K1)</p> <p>(N1) <math>\cos \angle RPQ = \frac{19}{21}</math></p> <p>RPQ = 25.21° (P1)</p> <p><math>(MN)^2 = 6^2 + 9^2 - 2(6)(9)\cos 25.21^\circ</math></p> <p>(N1) 4.31 cm</p> <p><math>\frac{1}{2} \times 6 \times 9 \times \sin 25.21^\circ</math> (K1)</p> <p>(N1) 11.50 cm</p>  <p>(N1)</p> <p>Use <math>\frac{\sin B'}{4.5} = \frac{\sin 25.21^\circ}{2}</math> (K1)</p> <p>(N1) 73.41°</p> <p>(N1) 106.59°</p>	<p><b>6</b></p> <p><b>4</b></p>	<p><b>10</b></p>



No.	Solution and Mark Scheme	Sub Marks	Total Marks
<p><b>15</b></p> <p><b>(a)</b></p> <p><math>0.5x + y \leq 10</math>      <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p><math>x + y \leq 15</math>            <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p><b>(b)</b></p> <p>Draw correctly at least one straight line from the *inequalities which involves <math>x</math> and <math>y</math>      <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p>Draw correctly all *straight line      <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N1</span></p> <p>The correct region shaded      <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p><b>(c)</b></p> <p><math>(10,5)</math>      <span style="border: 1px solid black; padding: 2px;">N1</span></p> <p>Substitute any point into <math>15x + 20y</math> in the *shaded region      <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">K1</span></p> <p><span style="border: 1px solid black; padding: 2px;">N1</span>      RM 250.00</p> <p><span style="border: 1px solid black; padding: 2px;">N1</span>      Cake =10 and cookies =5</p>	<p style="text-align: right;">Suitable scale</p>	<p style="text-align: center;">2</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p>	<p style="text-align: center;"><b>10</b></p>

Graph for Question 15(b)

