



**JABATAN PELAJARAN WILAYAH PERSEKUTUAN KUALA LUMPUR**

**PEPERIKSAAN PERCUBAAN**

**SIJIL PELAJARAN MALAYSIA 2008**

**SKEMA PEMARKAHAN**

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**ADDITIONAL MATHEMATICS**

**PAPER 2**

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## SECTION A

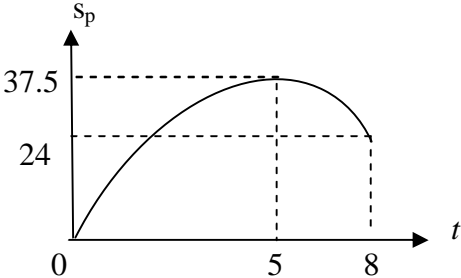
Question	Solution	Sub Mark	Full Mark
1.	$3r^2 + rs + 6 = 7 \text{ ---(1)}$ $3r + 2s = 7 \text{ -----(2)}$ $s = \frac{7-3r}{2} \text{ .....}$ $3r^2 + r\left(\frac{7-3r}{2}\right) + 6 = 7 \text{ .....}$ $3r^2 + 7r - 2 = 0$ $r = \frac{-(7) \pm \sqrt{(7)^2 - 4(3)(-2)}}{2(3)} \text{ .....}$ $r = 0.257, -2.591 \text{ .....}$ $s = 3.115, 7.387 \text{ .....}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>[5]</p>
2.	<p>(a) <math>\frac{dy}{dx} = 3(3-2x)^2(-2) \text{ .....}</math></p> <p><math>\frac{dy}{dx} = -6 \text{ .....}</math></p> <p><math>y - 1 = -6(x - 1) \text{ .....}</math></p> <p><math>y = -6x + 7 \text{ .....}</math></p> <p>(b) <math>l = 2\pi r</math></p> <p>(i) <math>\frac{dl}{dr} = 2\pi</math></p> <p><math>\frac{dr}{dt} = \frac{dr}{dl} \times \frac{dl}{dt}</math></p> <p><math>= \frac{1}{2\pi} \times (0.2) \text{ .....}</math></p> <p><math>= 0.03183 \text{ cms}^{-1} \text{ .....}</math></p> <p>(ii)</p> <p>Initial <math>r = \frac{60}{2\pi}</math></p> <p>After 5s, <math>r = \frac{60}{2(3.142)} + 5(0.03183) \text{ .....}</math></p> <p><math>r = 9.707 \text{ .....}</math></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>4</p> <p>4</p> <p>[8]</p>

<p><b>3.</b></p> <p>(a) <math>\angle POQ \times 10 = 11.2</math> .....  <math>\angle POQ = 1.12</math> radians .....</p> <p>(b) <math>\cos 1.12 = \frac{OR}{10}</math> .....  <math>OR = 4.357</math> cm .....  <math>RQ = 5.643</math> cm .....</p> <p>(c) Area of sector <math>POQ</math> – area of <math>\triangle POR</math> – area of quadrant <math>RSQ</math>  <math>= \frac{1}{2} \times 10^2 \times 1.12 - \frac{1}{2} \times (10 \sin 1.12) \times 4.357 - \frac{1}{2} \times \frac{\pi}{2} \times 5.643</math>  <math>= 56 - 19.609 - 25.01</math>  <math>= 11.38</math> cm<sup>2</sup> .....</p>		<p>1 1</p> <p>1 1</p> <p>1, 1</p> <p>1</p>	<p>2</p> <p>3</p> <p>3</p> <p>[8]</p>
<p><b>4.</b></p> <p>(a) The amount of savings at the end of every year forms a G.P with <math>a = 5000</math> <math>r = 1.035</math> .....</p> <p><math>T_n &gt; 6000</math>  <math>5000 (1.035)^{n-1} &gt; 6000</math> .....  <math>(1.035)^{n-1} &gt; 1.2</math>  <math>(n-1) \log 1.035 &gt; \log 1.2</math> .....  <math>n-1 &gt; 5.30</math>  <math>n &gt; 6.3</math>  <math>n = 7</math> .....</p> <p>(b) <math>T_{15} = 5000 (1.035)^{14}</math> .....  <math>= 8093.47</math> .....</p>		<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>[6]</p>
<p><b>5.</b></p> <p>(a)  (i) <math>P(X = 0) = {}^{10}C_0 \left(\frac{1}{3}\right)^0 \left(\frac{2}{3}\right)^{10}</math> .....  <math>= 0.01734</math> .....</p> <p>(ii) <math>P(X \geq 2) = 1 - P(X = 0) - P(X = 1)</math>  <math>= 1 - 0.01734 - {}^{10}C_1 \left(\frac{1}{3}\right)^1 \left(\frac{2}{3}\right)^9</math> .....  <math>= 0.8960</math> .....</p> <p>(b)  (i) <math>\bar{x} = \frac{1}{3}(600) = 200</math> .....</p> <p>(ii) <math>\sigma = \sqrt{600 \left(\frac{1}{3}\right) \left(\frac{2}{3}\right)}</math> .....  <math>= 11.547</math> .....</p>		<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>2</p> <p>2</p> <p>3</p> <p>[7]</p>

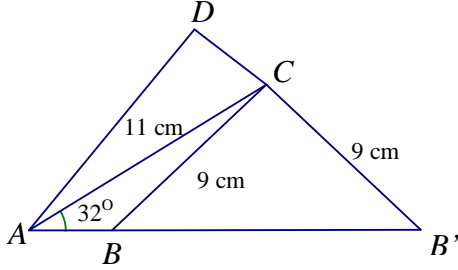


<p><b>9.</b></p> <p>(a) Construct lines to get modal marks .....  Mode = 66.17 (accept range 65.50 – 66.50) .....</p> <p>(b) <math>Q_1 = 39.5 + \left( \frac{\frac{45}{4} - 7}{5} \right) 10 = 48</math> .....</p> <p><math>Q_3 = 59.5 + \left( \frac{\frac{3(45)}{4} - 22}{12} \right) 10 = 69.292</math> .....</p> <p>Interquartile range = <math>69.292 - 48</math> .....  = 21.292 .....</p> <p>(c) Mean = <math>\frac{7(34.5) + 5(44.5) + 10(54.5) + 12(64.5) + 11(74.5)}{7 + 5 + 10 + 12 + 11}</math>  = 57.833 .....</p> <p>Standard deviation  <math>\sqrt{\frac{7(34.5)^2 + 5(44.5)^2 + 10(54.5)^2 + 12(64.5)^2 + 11(74.5)^2}{7 + 5 + 10 + 12 + 11} - 57.833^2}</math>  = 13.664 .....</p>	<p>1 1  1  1 1 1 1 1 1 1</p>	<p>2   4  4  4</p>	<p>10</p>
<p><b>10.</b></p> <p>(a) <math>2x^2 + 3 = 4x + 9</math> .....  <math>(x + 1)(x - 3) = 0</math> .....  <math>x = -1, h = 5</math> } .....  <math>x = 3, k = 21</math> }</p> <p>(b)</p> <p><math>\frac{1}{2}(5 + 21)(4)</math> or <math>\left[ \frac{2x^3}{3} + 3x \right]_{-1}^3</math> .....</p> <p><math>\left( \frac{2(3)^3}{3} + 3(3) \right) - \left( \frac{2(-1)^3}{3} + 3(-1) \right)</math> .....</p> <p>Area of trapezium – area under a curve  = <math>52 - 30\frac{2}{3}</math> .....</p> <p>= <math>21\frac{1}{3} \text{ unit}^2</math> .....</p> <p>(c) <math>\frac{1}{2}\pi \left[ \frac{y^2}{2} - 3y \right]_3^{21}</math> or <math>\frac{1}{3}\pi (3^2)(21 - 9)</math> .....</p> <p>= <math>\frac{1}{2}\pi \left\{ \left( \frac{21^2}{2} - 3(21) \right) - \left( \frac{3^2}{2} - 3(3) \right) \right\}</math> .....</p>	<p>1 1 1  1 1 1 1 1 1</p>	<p>3   4</p>	



<b>SECTION C</b>			
<i>Question</i>	<i>Solution</i>	<i>Sub Mark</i>	<i>Full Mark</i>
<b>12.</b>	<p>(a) <math>15 - 3t &gt; 0</math> .....</p> <p style="padding-left: 40px;"><math>0 &lt; t &lt; 5</math> .....</p> <p>(b) <math>s = 15t - \frac{3}{2}t^2</math></p> <p style="padding-left: 40px;"><math>= 15(5) - \frac{3}{2}(5)^2</math> .....</p> <p style="padding-left: 40px;"><math>= 37.5</math> .....</p> <p>Particle P reaches B. ....</p> <p>(c) When <math>t = 8</math>, <math>s = 15(8) - \frac{3}{2}(8)^2</math> .....</p> <p style="padding-left: 40px;"><math>s = 24</math></p> <p>Total distance travelled <math>= 2(37.5) - 24</math> or <math>37.5 + (37.5 - 24)</math>  <math>= 51</math> m .....</p> <p>(d)</p>  <p>Shape of the curve .....</p> <p>Critical points (0,0), (5, 37.5), (8, 24).....</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>2</p> <p>3</p> <p>3</p> <p>2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">10</div>
<b>13.</b>	<p>(a)(i) <math>\frac{11}{\sin \angle ABC} = \frac{9}{\sin 32^\circ}</math></p> <p>.....</p> <p><math>\angle ABC = 40.37^\circ</math> .....</p> <p><math>\angle ABC</math> is an obtuse angle</p> <p><math>\therefore \angle ABC = 139.63^\circ</math> or <math>139^\circ 38'</math> .....</p> <p>(ii) <math>32.86 = \frac{1}{2} \times 11 \times 6 \times \sin \angle ACD</math> .....</p> <p style="padding-left: 40px;"><math>\angle ACD = 84.72^\circ</math> or <math>84^\circ 43'</math> .....</p> <p>(iii) <math>AD^2 = 11^2 + 6^2 - 2(11)(6)\cos 84.72^\circ</math> .....</p> <p style="padding-left: 40px;"><math>AD = 12.04</math> .....</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>

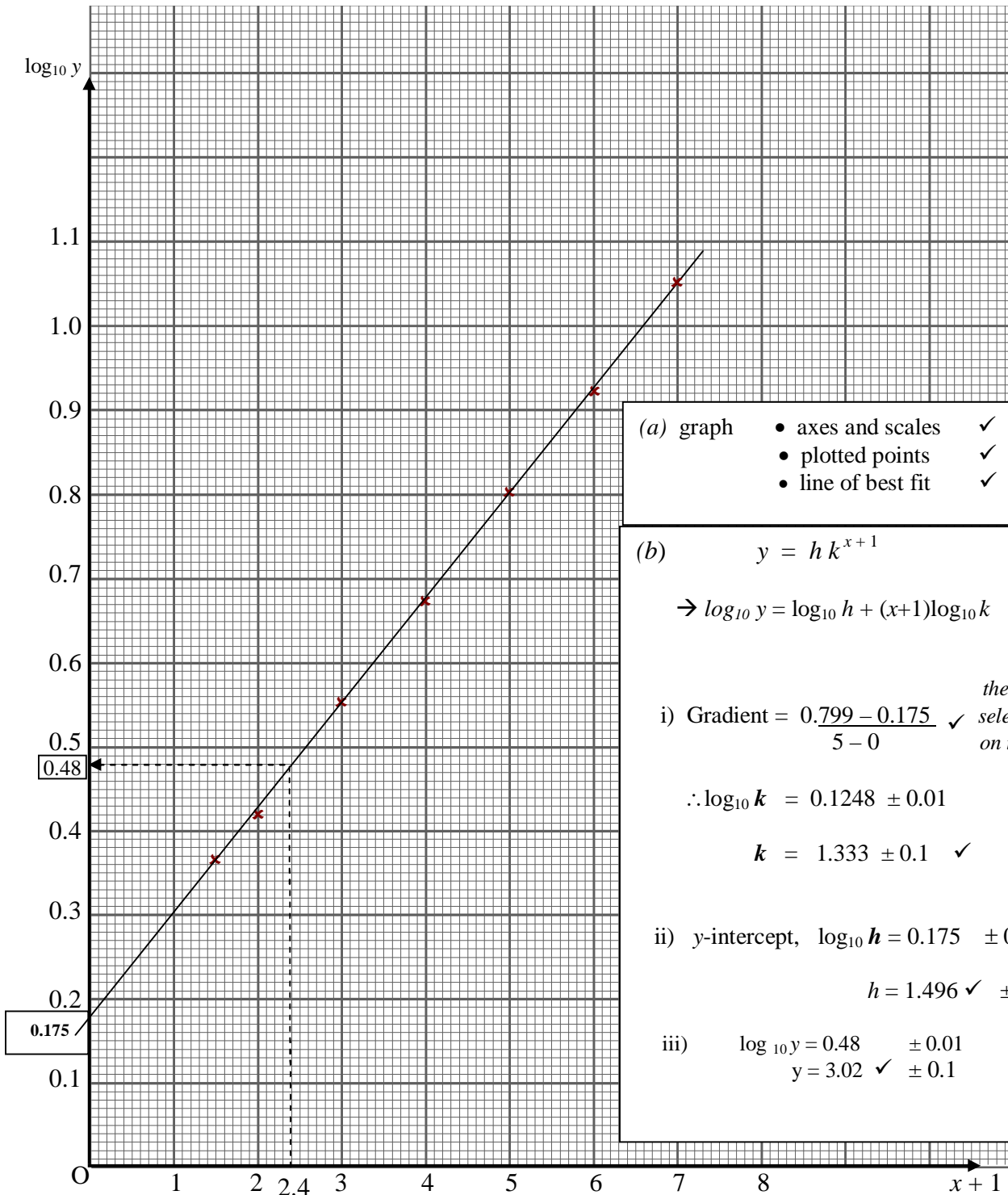


	<p>b) (i)</p>  <p><math>\triangle AB'C</math> drawn .....</p> <p>(ii) Area of <math>\triangle AB'C = \frac{1}{2} \times 11 \times 9 \times \sin 107.63^\circ</math> .....</p> <p><math>= 47.18 \text{ cm}^2</math> .....</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">10</div>
14.	Refer to the attachment on page 9.		
15.	<p>(a) (i) <math>x = \text{RM}1.20</math> .....</p> <p>(ii) <math>y = 160</math> .....</p> <p>(iii) <math>z = \text{RM}5.40</math> .....</p> <p>(b)</p> $\bar{I} = \frac{175(14) + 125(18) + 160(16) + 135(19) + 110(13)}{14 + 18 + 16 + 19 + 13}$ <p><math>\bar{I} = 140.7</math> .....</p> <p>(c) <math>\frac{\text{Expenditure 2004}}{684} \times 100 = 140.7</math> .....</p> <p>Expenditure 2004 = RM962.39 .....</p> <p>(d) <math>\bar{I}_{2007/2000} = \frac{115}{100} \times 140.7</math> .....</p> <p><math>= 161.8</math> .....</p>	<p>1</p> <p>1</p> <p>1</p> <p>1,1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>3</p> <p>3</p> <p>2</p> <p>2</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">10</div>

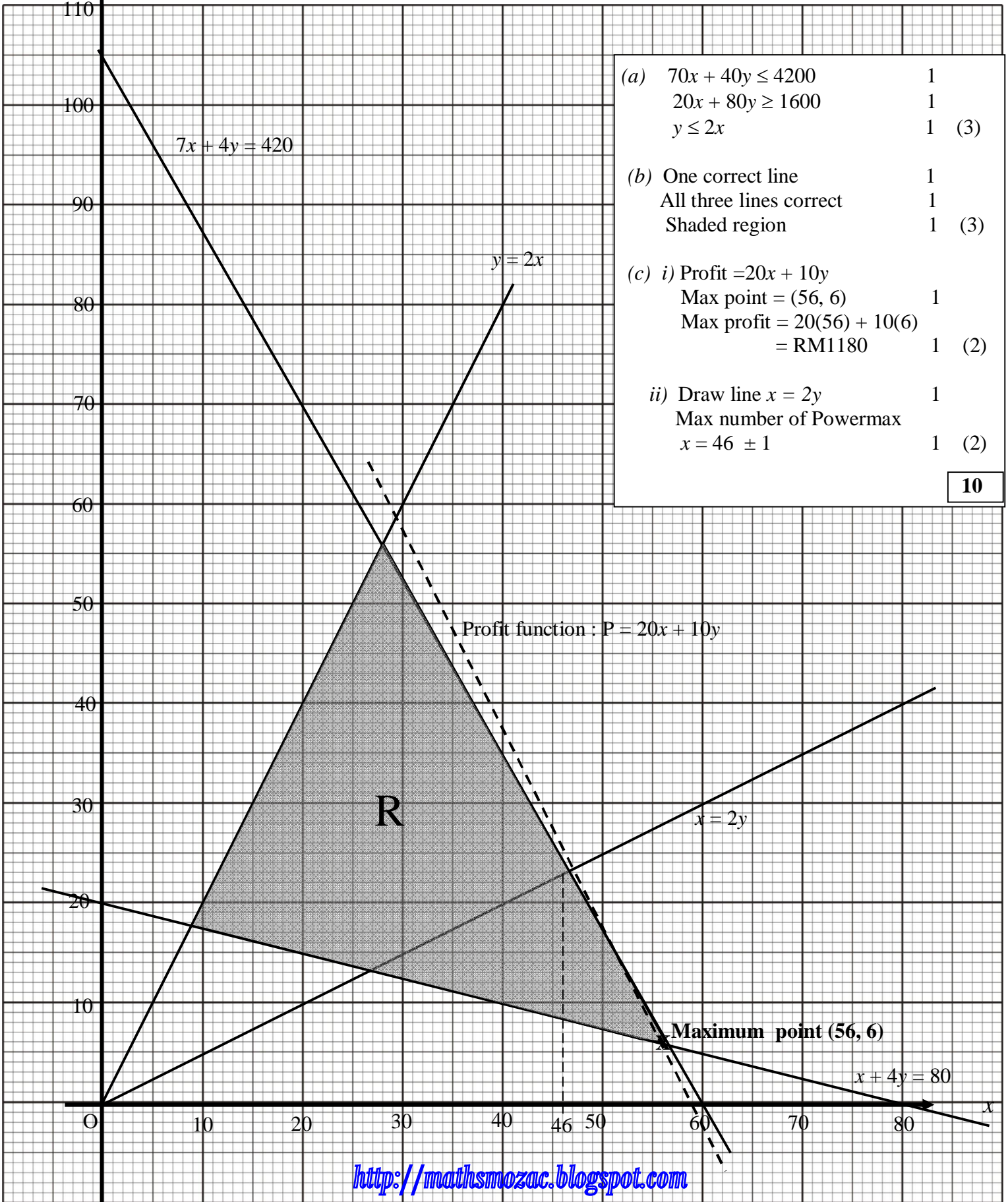
## QUESTION 7

$x + 1$	1.5	2	3	4	5	6	7
$\log_{10} y$	0.362	0.415	0.550	0.672	0.799	0.919	1.049

At least 2 decimal places ✓ 1



Question 14



(a)	$70x + 40y \leq 4200$	1
	$20x + 80y \geq 1600$	1
	$y \leq 2x$	1 (3)
(b)	One correct line	1
	All three lines correct	1
	Shaded region	1 (3)
(c) i)	Profit = $20x + 10y$	
	Max point = (56, 6)	1
	Max profit = $20(56) + 10(6)$	
	= RM1180	1 (2)
ii)	Draw line $x = 2y$	1
	Max number of Powermax	
	$x = 46 \pm 1$	1 (2)

10