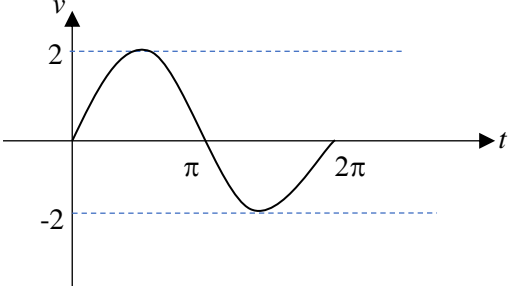


**PERATURAN PEMARKAHAN PEPERIKSAAN PERCUBAAN SPM 2019
MODUL PINTAS**

MATEMATIK TAMBAHAN KERTAS 2

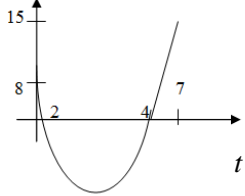
NO	SOLUTIONS	MARKS		
1	(a) $\pi \int_{-9}^0 (y+9)dy$ $\frac{y^2}{2} + 9y$ $\left[(0) - \left(\frac{81}{2} - 81 \right) \right]$ $\frac{81}{2} \pi$	K1		
	(b) $(7 \times 8) - 21 \frac{1}{3}$ $34 \frac{2}{3}$	K1		
	(a) $2^{3(1)} - 4(1) \cdot 2^1 + 2^1 - 2$ 0	K1		
2	(b) $\log_a N = \frac{1}{2} (\log_a 24 - \log_a 0.375 - \log_a 729)$	K1		
	$\log_a N = \frac{1}{2} (\log_a \frac{24}{(0.375)(729)})$	K1		
	$\log_a N = \log_a (\frac{64}{729})^{\frac{1}{2}}$	K1		
	$\log_a N = \log_a \frac{8}{27}$	K1		
	$N = \frac{8}{27}$	N1		
$\log_a N = 3$	N1	6	10	

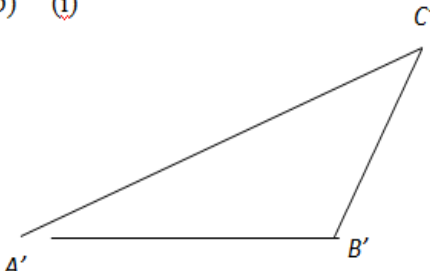
3	<p>(a) (i) $3\mathbf{a}$</p> <p>(ii) $-\mathbf{a} + \mathbf{b}$</p> <p>(iii) $PA = \frac{1}{3}PQ$ $-\frac{1}{3} + \frac{1}{3}\mathbf{b}$ (accept answer without working)</p>	N1 N1 K1 N1	4	
4	<p>(b) $\overrightarrow{OB} = \frac{9}{5}(\overrightarrow{OP} + \overrightarrow{PA})$</p> <p>$\frac{6}{5}\mathbf{a} + \frac{3}{5}\mathbf{b}$</p> <p>$(30.2x - 20.4y) - xy = 500$</p> <p>$2x + 2y = 43.2$</p> <p>$x = 21.6 - y$</p> <p>$(21.6 - y)(y) = 116.08$</p> <p>$y^2 - 21.6y + 116.08 = 0$</p> <p>$y = \frac{-(-21.6) \pm \sqrt{(-21.6)^2 - 4(1)(116.08)}}{2(1)}$</p> <p>$y = 11.55, x = 10.05$ or $y = 10.05, x = 11.55$</p> <p>Perimeter of the ungrazed field = 101.2</p>	K1 N1 P1 P1 K1 K1 K1 N1 N1	2 7	6 7
5	<p>(a) $(62 \times 18) + (88 \times 23) + (16 \times 28) + (13 \times 33) + (11 \times 38) + (10 \times 43)$</p> <p>$\frac{(62 \times 18) + (88 \times 23) + (16 \times 28) + (13 \times 33) + (11 \times 38) + (10 \times 43)}{200}$</p> <p>24.33</p> <p>$(62 \times 18^2) + (88 \times 23^2) + (16 \times 28^2) + (13 \times 33) + (11 \times 38^2) + (10 \times 43^2)$</p> <p>$\sqrt{\frac{(62 \times 18^2) + (88 \times 23^2) + (16 \times 28^2) + (13 \times 33^2) + (11 \times 38^2) + (10 \times 43^2)}{200} - (24.33)^2}$</p> <p>6.828</p>	K1 K1 N1 K1 K1 N1	6	
	(b) Mean will reduce 5 and standard deviation unchanged	N1	1	7

6	<p>(a) Use identity:</p> $\sin 2t = 2 \sin t \cos t$ <p>or $\cos 2t = 1 - 2 \sin^2 t$</p> $\frac{2 \sin t (\cos t - \sin t)}{\cos t - \sin t}$ $2 \sin t$	K1		
	<p>(b)</p>  <p>Shape: $\sin t$ or $\cos t$</p> <p>Amplitude=2</p> <p>Cycle = 1 $0 \leq t \leq 2\pi$</p>	P1 P1 P1	3	6
7	<p>(a) $\cos \angle COP = \frac{2}{8}$ or 75.52 or 104.48</p> <p>1.823</p>	K1 N1	2	
	<p>(b) $\frac{10}{\cos 37.76}$ or $\sqrt{(8)^2 + 2^2}$</p> $12.65 \times \left(\frac{37.76}{180} \times 3.142 \right)$ <p>$PB = 8.338$ or $BC = 2.65$ or $PD = 12.65$</p> $8.338 + 2.65 + 7.746$ <p>18.73</p>	K1 K1 K1 K1 N1	5	
	<p>(c) $\frac{1}{2}(12.65)^2(0.6591)$ or $\frac{1}{2}(10)(7.746)$</p> $\frac{1}{2}(12.65)^2(0.6591) - \frac{1}{2}(10)(7.746)$ <p>14.01</p>	K1 K1 N1	3	10

8	$(a) \left(\frac{k - (-2)}{7 - 3} \right) = \frac{3}{2}$ $k = 4$	K1		
		N1	2	
	$(b) \left(\frac{7+3}{2}, \frac{4+(-2)}{2} \right)$ $m = \frac{8-1}{1-5}$ $y - 8 = -\frac{7}{4}(x - 1)$ $y = -\frac{7}{4}x + \frac{39}{4}$	K1		
		K1		
		K1		
		N1	4	
8	$(c) \frac{1}{2} 1(8) + 7(-2) + 3(8) - 8(7) - 4(3) - (-2)(1) $			
	<i>or</i>	K1		
	$\frac{1}{2} 5(6) + 4(3) + 2(1) - 1(4) - 6(2) - 3(5) $			
	26 <i>or</i> 6.5	K1		
	$\frac{26}{6.5}$	K1		
4 : 1	N1	4	10	
9	a) $p = \frac{2}{5}$ <i>or</i> $q = \frac{3}{5}$	P1		
	(i) $1 - P(X=0) - P(X=1) - P(X=2)$ <i>or</i>	K1		
	$1 - 0.0467 - 0.1866 - 0.31104$	N1		
	0.4557			
	(ii) 1308	N1		
	$\sigma = 28.01$	N1	5	
	b)(i) $\frac{13-10}{4}$ @ 0.75 <i>seen</i>	K1		
	0.7734	N1		
	(ii) $P(X > 136)$ <i>or</i> $P(X < 9.6)$	K1		
	0.1841×145 <i>or</i> 0.4602×145	K1		
13: 33	N1			
		5	10	

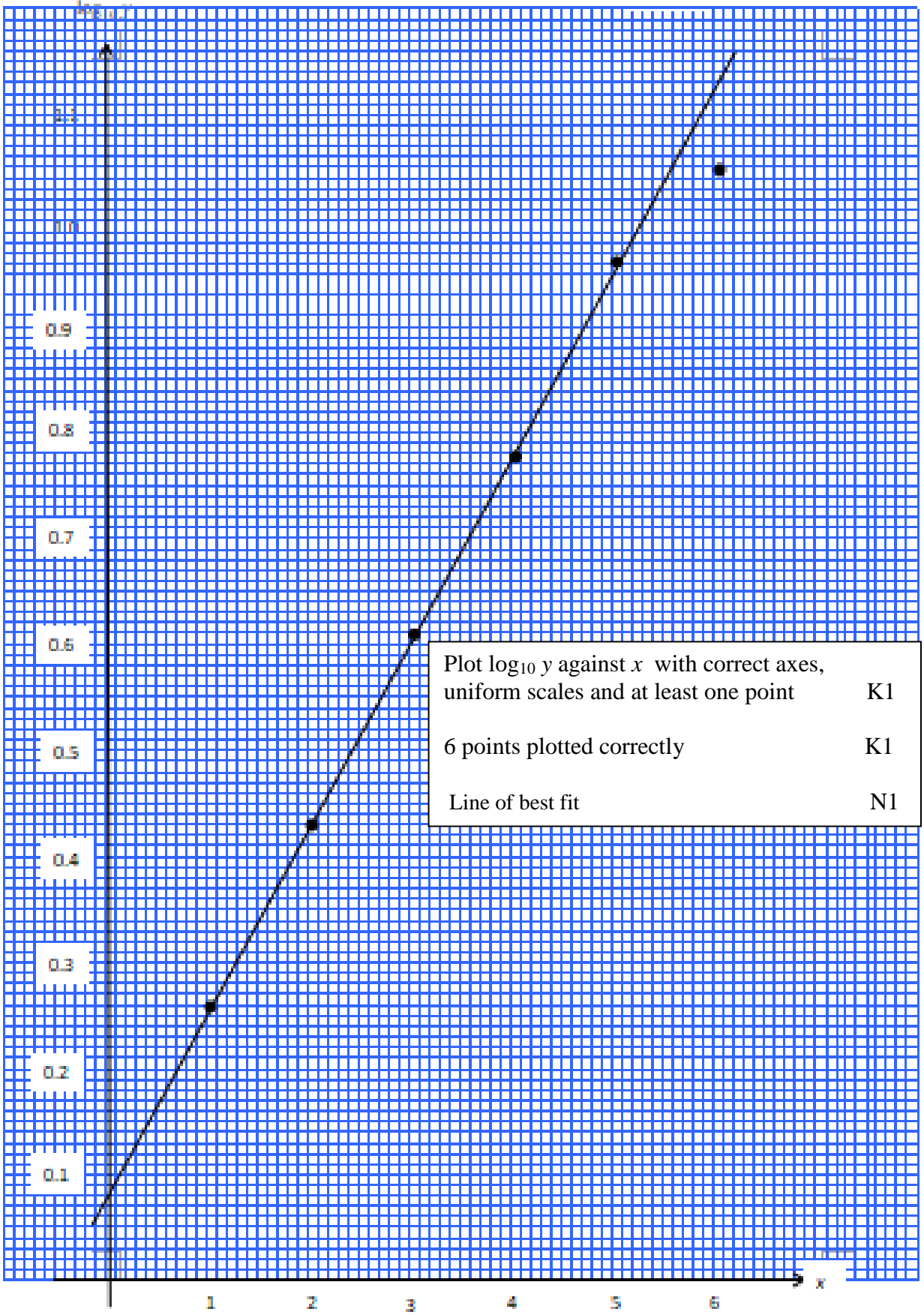
10	<p>(a) All values of x and $\log_{10}y$ correct</p> <table border="1" data-bbox="355 248 1046 327"> <thead> <tr> <th>x</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>$\log_{10}y$</td> <td>0.26</td> <td>0.43</td> <td>0.61</td> <td>0.78</td> <td>0.96</td> <td>1.05</td> </tr> </tbody> </table> <p>(b) refer graph</p>	x	1	2	3	4	5	6	$\log_{10}y$	0.26	0.43	0.61	0.78	0.96	1.05	N1 K1 K1N1	4	
x	1	2	3	4	5	6												
$\log_{10}y$	0.26	0.43	0.61	0.78	0.96	1.05												
	<p>(c) (i) $y_{incorrect} = 11.22$ and $y_{actual\ value} = 13.49$ (ii) $\log_{10} y = x \log_{10} k + \log p$</p> <p>$\log k = 0.175$ (0.17 - 0.175) $k = 1.50$ (1.48 - 1.50) $\log p = 0.85$ $p = 7.079$</p>	N1 P1 K1 N1 K1 N1	6	10														
11	<p>(a) $A = \pi r^2 + 2\pi r h + 2 \pi r^2$</p> <p>$A = 3\pi r^2 + 2\pi r h$</p> <p>$V = \pi r^2 h + \frac{2}{3}\pi r^3$</p> <p>(b) $3\pi r^2 + 2\pi r h = 20\pi$</p> <p>$h = \frac{20 - 3r^2}{2r}$</p> <p>$V = \pi r^2 \left(\frac{20 - 3r^2}{2r} \right) + \frac{2}{3}\pi r^3$</p> <p>$V = 10\pi r - \frac{5}{6} \pi r^3$</p>	K1 N1 N1 K1 K1 N1	3 4															
	<p>(c)</p> <p>$\frac{dv}{dr} = 10\pi - \frac{5}{2} \pi r^2$</p> <p>$\left(10\pi - \frac{5}{2} \pi (1.5)^2 \right) \times 0.4$</p> <p>$1.75\pi$</p>	K1 K1 N1	3	10														

12	<p>(a)(i) $2t - 6 = 0$ $v = (3)^2 - 6(3) + 8$ $v = -1$</p> <p>(ii) $(t - 2)(t - 4) = 0$</p> $\frac{t^3}{3} - 3t^2 + 8t$ $\left(\frac{4^3}{3} - 3(4)^2 + 8(4)\right) - \left(\frac{2^3}{3} - 3(2)^2 + 8(2)\right)$ $\frac{4}{3}$	K1 K1 N1		
	<p>(b)</p>  <p>Shape graph U</p> <p>Graph intersect x-axis at 2 and 4</p> $3 < t \leq 7$	N1 N1 N1	7 3	10
13	<p>(a) $\frac{x}{3.50} \times 100 = 125$ or $\frac{6}{y} \times 100 = 110$ or $\frac{5.50}{4.00} \times 100 = z$</p> <p>$x = 4.38$</p> <p>$y = 5.45$</p> <p>$z = 137.5$</p>	K1 N1 N1 N1	4	
	<p>(b) $(120 \times 5) + (125 \times 3) + (110 \times 4) + (137.5 \times 1)$</p> $\frac{(120 \times 5) + (125 \times 3) + (110 \times 4) + (137.5 \times 1)}{13}$ <p>119.42</p>	K1 K1 N1	3	
	<p>(c) $\frac{119.42 \times 115}{100}$</p> <p>$\frac{p}{40} \times 100 = 137.33$</p> <p>RM 54.93</p>	K1 K1 N1	3	10

14	<p>(a) (i) $4.7^2 = 6.5^2 + 5^2 - 2(6.5)(5) \cos A$</p> <p>45.99</p> <p>(ii) $\frac{BD}{\sin 45.99} = \frac{5}{\sin 88.02}$</p> <p>3.598</p>	K1 N1 K1 N1	4	
	<p>b) (i)</p>  <p>$\frac{\sin B}{6.5} = \frac{\sin 45.99}{4.7}$</p> <p>$\angle ABC = 84.08$</p> <p>$\angle A'C'B' = 38.09$</p>	P1 K1 N1 N1	4	
	<p>(c) $\frac{1}{2}(6.5)(4.7)(\sin 38.09)$</p> <p>9.423</p>	K1 N1	2	10

15	(a) $x \geq 50$ $y \geq 180$ $24x + 8y \leq 8000$ or $3x + y \leq 1000$ $x + y \leq 800$	N1 N1 N1 N1	4	10
	(b) Refer to graph paper One *straight line drawn correctly All * straight line drawn correctly Correct region	K1 K1 N1	3	
	(c) (i) $180 \leq x \leq 390$ (ii) $P_{\max} = 30x + 10y$ $30(100) + 10(700)$ 1000	N1 K1 N1	3	

QUESTION 10



Plot $\log_{10} y$ against x with correct axes, uniform scales and at least one point	K1
6 points plotted correctly	K1
Line of best fit	N1

QUESTION 15

