



**MODUL PINTAS
TINGKATAN 5**

**ADDITIONAL MATHEMATICS
Kertas 2**

3472/2

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

PERATURAN PEMARKAHAN ADDITIONAL MATHEMATICS K2 3472/2

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(a)	Shape of sine graph P1 Max = $\frac{3}{2}$, Min = 0 (Amplitude = $\frac{3}{2}$) P1 2 cycle of sine graph for $0 \leq x \leq 2\pi$ P1 Modulus of sine graph P1 } Accept cosine graph <u>Note:</u> 1. Do not accept tangent graph 2. Ignore graph outside the range	4	
(b)	$y = \frac{x}{2}\pi$ N1 Implied (straight line passing two correct Sketch the straight line involving A and y with *gradient <u>or</u> *y-intercept correct K1 N1 Number of solutions = 8	3	
			7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
2(a)(i)	Use triangle law K1 $\vec{PQ} = \vec{PO} + \vec{OQ}$ Or $-3x - 4y + 2x + 7y$ N1 $\vec{PQ} = -x + 3y$	4	
(a)(ii)	Use triangle law K1 $\vec{PR} = \vec{PO} + \vec{OR}$ Or $-3x - 4y + (m - 2)x + 5y$ N1 $\vec{PR} = (m - 5)x + y$		
(b)	$\vec{PQ} = \lambda \vec{PR}$ K1 Compare coefficient of y K1 $\lambda = 3$ N1 $m = \frac{14}{3}$	3	
			7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
3(a)	$2\pi, 4\pi, 6\pi$ K1 N1 <i>Janjang Aritmetik</i>	2	
(b)	$a = 2\pi, d = 2\pi$ P1 N1 K1 $S_7 = \frac{7}{2}[2(2\pi) + (7 - 1)(2\pi)]$ N1 56π	3	

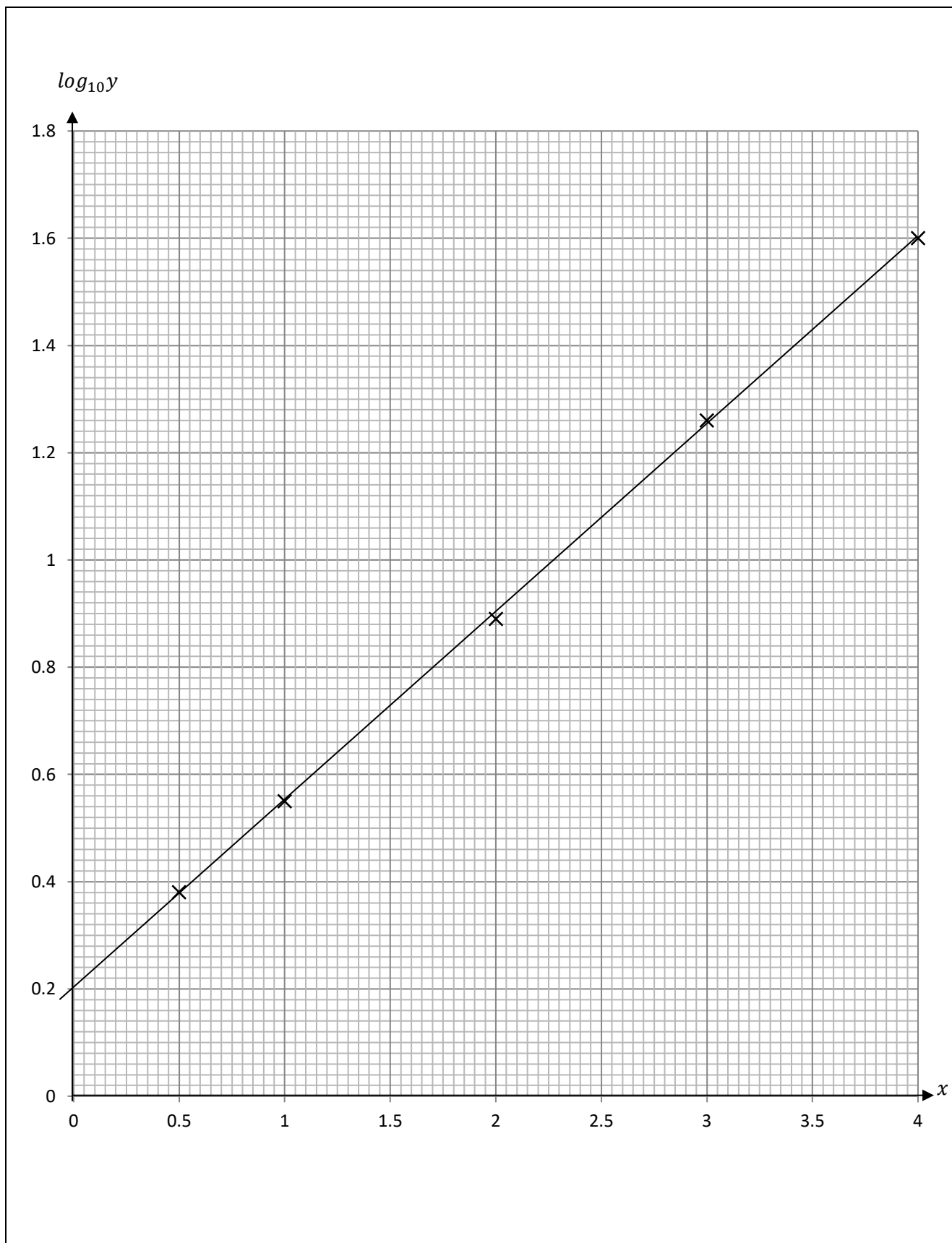
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No.	Solution and Mark Scheme	Sub Marks	Total Marks
4	$h = r + 4$ P1 $2\pi r^2 + 2\pi rh = 60\pi$ P1 K1 $2\pi r^2 + 2\pi r(r + 4) = 60\pi$ K1 Solve the quadratic equation $ax^2 + bx + c = 0$ for $b \neq 0$ Completing the square $(x + 1)^2 - (1)^2 - 15 = 0$ OR Formula $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-15)}}{2(1)}$ <i>a, b, c must be correct</i> OR Factorisation $(r + 5)(r - 3) = 0$ N1 $r = -5, 3$ N1 $r = 3$ Accept positive number only N1 $h = 7$	7	7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
5(a)	<u>Use law of indices</u> $2x + 3 = x$ K1 N1 $x = -3$	2	
(b)	<u>Use law of logarithms</u> $\log_2 5 + \log_4 16 + \log_4 x = 4$ $\log_2 5 + 2 + \frac{\log_2 x}{2} = 4$ <u>Use law of logarithms</u> $\log_2 5 + \frac{\log_2 16x}{\log_2 4} = 4$ $\log_2 x = \log_2 \frac{2^4}{5^2}$ K1 N1 $x = \frac{16}{25}$	5	7

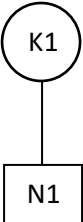
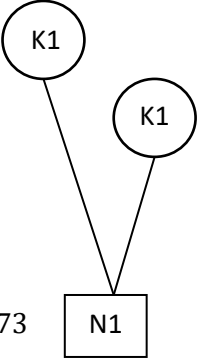
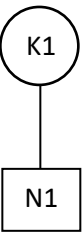
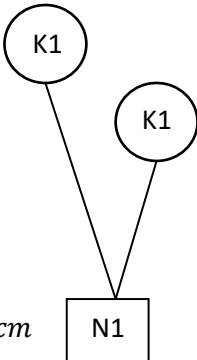
No.	Solution and Mark Scheme	Sub Marks	Total Marks
6(a) (b)	Use Completing the square $-\left[\left(x + \frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)^2 - 4\right]$ K1 K1 $-\left(x + \frac{3}{2}\right)^2 + \frac{25}{4}$ N1 $\left(-\frac{3}{2}, \frac{25}{4}\right)$	3	
	The shape of the graph N1 Max point $\left(-\frac{3}{2}, \frac{25}{4}\right)$ N1 x-intercept at -4 and 1 N1 y-intercept at 4 N1	4	7

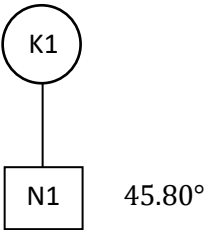
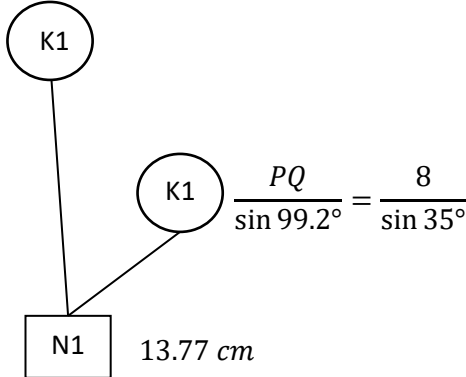
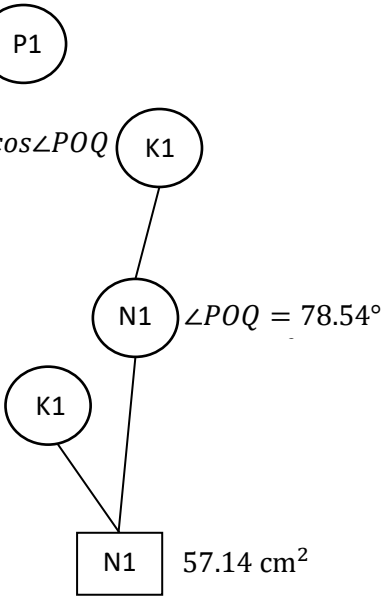
No.	Solution and Mark Scheme	Sub Marks	Total Marks							
7(a)	<table border="1"><tr><td>$\log_{10}y$</td><td>0.38</td><td>0.55</td><td>0.89</td><td>1.26</td><td>1.60</td></tr></table>	$\log_{10}y$	0.38	0.55	0.89	1.26	1.60	<table border="1"><tr><td>N1</td></tr></table>	N1	
	$\log_{10}y$	0.38	0.55	0.89	1.26	1.60				
	N1									
Plot $\log_{10}y$ against x (Correct axes and uniform scales)	1									
6 *points plotted correctly	3									
(b)(i)	Line of best fit (At least *5 points plotted)									
	$\log_{10}y = \frac{\log_{10}a}{2}(x) - \log_{10}b$									
	$Use * m = \frac{\log_{10}a}{2}$									
(ii)	$a = 4.979$									
	$b = 0.631$									
	$y = 26.30$									
	<u>Note:</u> SS-1 if part of scale is not uniform at the $\log_{10}y - axis$ and/or the $x - axis$ from the first point to the last point OR does not use the given scales OR does not use the graph paper									
			10							

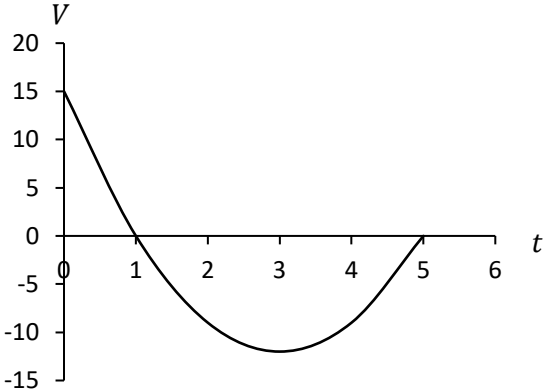


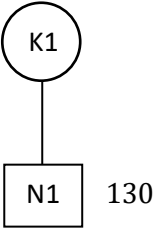
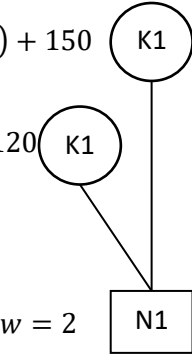
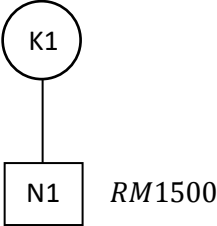
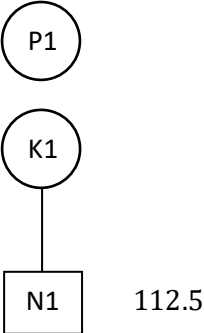
No.	Solution and Mark Scheme	Sub Marks	Total Marks
8(a)	Solve using simultaneous equation $\begin{aligned} 3y + 2x - 4 &= 0 \\ 2y - x - 5 &= 0 \end{aligned}$ K1 (-1,2) N1 K1 $x = -1$ and $y = 2$	3	
(b)	Substitute $y = 0$ into $3y + 2x - 4 = 0$ K1 N1 (2,0) K1 $x = 2$	3	
(c)	Use the formula of midpoint $\left(\frac{x+2}{2}, \frac{y+0}{2}\right) = (-1, 2)$ K1 $x = -4$ or $y = 4$ K1 N1 (-4,4) K1 $\frac{x+2}{2} = -1$ or $\frac{y+0}{2} = 2$	4	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
9(a)	(2, 0) N1	1	
(b)	seen $y - intercept = 4$ and $x - intercept = 4$ P1 Integrate $\int (y^2 + 2)dy$ K1 $A_1 = \frac{y^3}{3} + 2y$ $A_2 = \frac{1}{2}(3)(3)$ K1 K1 Use limit $\int_0^1$ into A_1 K1 * A_1 + * A_2 N1 $\frac{41}{6} unit^2$	6	
(c)	Integrate $\pi \int (x - 2)dx$ K1 $\frac{x^2}{2} - 2x$ K1 Use limit $\int_2^3$ into $\frac{x^2}{2} - 2x$ N1 $\frac{1}{2} \pi unit^3$	3	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
10(a)(i)	$\frac{\text{Use } \sigma^2 = npq}{147 = 420(1 - p)}$  $p = 0.65$	2	
(ii)	${}^9C_r (0.65)^r (0.35)^{9-r}$  0.3373 $1 - P(X = 0) - P(X = 1) - P(X = 2) - P(X = 3) - P(X = 4) - P(X = 5) - P(X = 6)$ or $P(X = 7) + P(X = 8) + P(X = 9)$	3	
(b)(i)	$z = \left(\frac{126 - 132}{15} \right)$  0.3446	2	
(ii)	Find the value of z if $p=0.25$ $z = 0.674$  $h = 142.11 \text{ cm}$ $\frac{h - 132}{15} = 0.674$	3	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
12(a)	$\frac{\sin \angle RPQ}{10} = \frac{\sin 35^\circ}{8}$ 	2	
	(b) $\angle PRQ = 180^\circ - 45.8^\circ - 35^\circ$ 	3	
	(c) $OQ = 11.66$ 	5	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
13(a)(i)	$\frac{\text{Differentiate } s \text{ and } v=0}{3t^2 - 18t + 15 = 0}$ K1 N1 15 ms⁻¹	2	
(ii)	$\frac{\text{Differentiate } v \text{ and } a=0}{6t - 18 = 0}$ K1 K1 N1 $\frac{\text{Substitute } t = 3 \text{ into } V}{V = 3(3)^2 - 18(3) + 15}$ -12ms⁻¹	3	
(iii)	$\frac{\text{Solve } 3t^2 - 18t + 15 > 0}{(t - 5)(t - 1) > 0}$ K1 N1 $t < 1, t > 5$	2	
(b)	 Shape of the graph N1 x-intercept at 1 and 5 N1 y-intercept at 15 N1	3	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
14(a)	$\frac{RM10.40}{RM8.00} \times 100$ 	2	
(b)(i)	$(115 \times 4) + (* 130w) + (114 \times (2w + 1)) + 150$ $\frac{(115 \times 4) + (* 130w) + (114 \times (2w + 1)) + 150}{4 + w + 2w + 1 + 1} = 120$ 	3	
(ii)	$\frac{RM1800}{Cost\ 2014} \times 100 = 120$ 	2	
(c)	$Increase\ 35\% = 135$ $\frac{120 \times I}{100} = 135$ 	3	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
15(a)	$x + y \geq 20$ N1	3	
	$20x + 10y \geq 140$ N1		
	$x - y \leq 2$ N1		
	(b) Draw line correctly at least one straight line from *inequalities involving x only K1 Draw correctly all the three *straight line N1 <u>Note:</u> Accept dotted lines and solid line Region shaded correctly N1	3	
(c)	<i>Form equation</i> <i>Total energy used = 5000x + 3500y</i> P1 K1 (11,9) <i>Subtitute point * (11,9)</i> <i>* shaded region into 5000x + 3500y</i> K1 N1 86,500 kalori	4	
			10

