Question	Answer	Marks	Partial Marks
7(a)	Correctly eliminates x or y e.g. $4x^2 - 3\left(\frac{2}{x}\right)^2 + x\left(\frac{2}{x}\right) = 24$ oe or $4\left(\frac{2}{y}\right)^2 - 3y^2 + y\left(\frac{2}{y}\right) = 24$ oe	**M1**	
	Rearranges to a 3-term quadratic in x^2 or y^2 soi e.g. $4x^4 - 22x^2 - 12[=0]$ or $2x^4 - 11x^2 - 6[=0]$ or $3y^4 + 22y^2 - 16[=0]$ oe	**A1**	
	Factorises or solves *their* 3-term quadratic in x^2 or y^2 soi e.g. $(2x^2 + 1)(x^2 - 6)$ or $(3y^2 - 2)(y^2 + 8)$	**M1**	
	$x^2 = 6$ oe, nfww or $y^2 = \frac{2}{3}$ nfww	**A1**	
	$\left(\pm\sqrt{6}, \pm\frac{2}{\sqrt{6}}\right)$ or $\left(\pm\sqrt{6}, \pm\sqrt{\frac{2}{3}}\right)$ oe, nfww	**A1**	and no other values; **dep** on at least the first M1 A1
7(b)	$\sqrt{(x_P - x_Q)^2 + (y_P - y_Q)^2}$ oe, soi	**M1**	**FT** providing *their* x_P, x_Q and *their* y_P, y_Q are non-zero
	$\frac{4}{3}\sqrt{15}$	**A1**	
8(a)	Points plotted at x: 1, 3, 5, 10, 12 lg$y$: 1.6, 2.2, 2.8, 4.3, 4.9 soi and ruled, single straight line of best fit	**B2**	**B1** for at least 4 correctly plotted points
8(b)	lg$y$ = lg$A$ + $x$lg$b$ soi	**B1**	
	lg$A$ = *their* 1.3 soi	**M1**	**dep** on using linear points
	lg$b$ = *their* $\frac{4.9 - 1.6}{12 - 1}$ oe or lg$b$ = 0.3 oe soi	**M1**	**dep** on using linear points
	$A = 10^{1.3}$ isw and $b = 10^{\frac{3}{10}}$ isw	**A2**	**A1** for $A = 10^{1.3}$ isw or $b = 10^{\frac{3}{10}}$ isw
	A = 20 and b = 2 nfww	**A1**	If zero scored, award **SC1** for A = 20 and **SC1** for b = 2 found without using the graph in any way

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Question	Answer	Marks	Partial Marks
8(c)	lg1500 = 3.2 or 3.17[60...]	**M1**	
	OR $x = \log_{their\,b}\left(\frac{1500}{their A}\right)$		**FT** *their A* and *b*
	OR $x = \frac{\lg 1500 - their \lg A}{their \lg b}$		**FT** *their* lg*A* and lg*b*
	awrt 6.2 to awrt 6.4 isw	**A1**	
9(a)	$[A=]\frac{1}{2}x^2 \times 0.5 + \frac{1}{2}(x+2)^2 \times 2 + \frac{1}{2}y^2[\times 1]$ soi	**B1**	
	[*P* =] $x + 0.5x + 2 + 2(x+2) + (x+2-y) + y + y$	**M1**	Attempts to form an expression in *x* and *y* for the perimeter using arc lengths and lengths of lines
	Equates *P* to 24 and rearranges: $y = 16 - \frac{9}{2}x$	**A1**	
	$A = \frac{5}{4}x^2 + 4x + 4 + 128 - 72x + \frac{81}{8}x^2$ oe leading to given answer $A = \frac{91}{8}x^2 - 68x + 132$	**A1**	
9(b)	$\frac{dA}{dx} = \frac{91}{4}x - 68$	**M1**	
	Solves $\frac{dA}{dx} = 0$ for *x*	**M1**	**FT** *their* $\frac{dA}{dx}$ providing at least one term is correct
	$x = \frac{272}{91}$ or $2\frac{90}{91}$ or 2.99 or 2.989[01...] rot to 4 or more sf	**A1**	
	$A = \frac{91}{8}\left(\frac{272}{91}\right)^2 - 68\left(\frac{272}{91}\right) + 132$	**M1**	**FT** *their x*
	$A = \frac{2764}{91}$ or $30\frac{34}{91}$ or 30.4 or 30.37[36...] rot to 4 or more sf	**A1**	

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