Question	Answer	Marks	Guidance
4(b)	**Alternative method 1**		
	$\log_3 x = \frac{1}{\log_x 3}$ soi	**B1**	For change of base.
	$2(\log_x 3)^2 - 5(\log_x 3) + 2 = 0$	**M1**	For attempt to obtain a 3-term quadratic equation, equated to zero. Allow one sign error.
	$2\log_x 3 = 1 \quad \log_x 3 = 2$	**M1**	**Dep** for attempt to solve *their* quadratic equation and a correct attempt to obtain at least one value of x.
	$x = \sqrt{3}$ oe	**A1**	Allow 1.73(2…)
	$x = 9$	**A1**	
	Alternative method 2		
	$\log_3 x = \frac{\lg x}{\lg 3}$ and $\log_x 3 = \frac{\lg 3}{\lg x}$ oe	**B1**	For a consistent change of base.
	$2(\lg x)^2 - 5(\lg x) + 2(\lg 3)^2 = 0$ oe	**M1**	For attempt to obtain a 3-term quadratic equation, equated to zero. Allow one sign error.
	$2\lg x = \lg 3 \quad \lg x = 2\lg 3$ oe	**M1**	**Dep** for attempt to solve *their* quadratic equation and a correct attempt to obtain at least one value of x.
	$x = \sqrt{3}$ oe	**A1**	Allow 1.73(2…)
	$x = 9$ oe	**A1**	
5(a)		**2**	**B1** for 3 or 4 correctly plotted points

Question	Answer	Marks	Guidance
5(b)	$\ln y = mx^2 + c$ soi	**B1**	$m \neq \ln A,\ c \neq \ln b$
	Gradient = $\ln b$	**M1**	For attempt to find the numerical gradient of *their* straight line graph and equate to $\ln b$. May be implied by later work
	$b = 4$	**A1**	
	Intercept on vertical axis = $\ln A$	**M1**	For use of *their* intercept on the vertical axis of *their* straight line graph oe.
	$A = 0.5$	**A1**	
	Alternative method		
	$\ln y = mx^2 + c$ soi	**B1**	$m \neq \ln A,\ c \neq \ln b$
	Forming 2 equations correctly using points on *their* graph	**M1**	
	Solving the equations to obtain either A or b	**M1**	**Dep**
	$b = 4$	**A1**	
	$A = 0.5$	**A1**	
	Special case		
	$A = 0.5$ not using transformed data	**B1**	
	$b = 4$ not using transformed data	**B1**	
5(c)	35 nfww Allow answers between 33 and 37	**2**	**M1** for attempt at a complete method using *their* straight line graph or equation
5(d)	1.63 nfww Allow answers between 1.5 and 1.7	**2**	**M1** for attempt at a complete method using *their* straight line graph or equation

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Question	Answer	Marks	Guidance
6	$k(5x+2)^{\frac{3}{5}}$	**M1**	
	$f'(x)=\frac{1}{3}(5x+2)^{\frac{3}{5}} \quad (+c)$	**A1**	Condone omission of c
	$\frac{17}{3}=\frac{1}{3}(32)^{\frac{3}{5}}+c$ oe	**M1**	**Dep** for use of $f'(6)$ and attempt to evaluate c
	$c=3$	**A1**	
	$k(5x+2)^{\frac{8}{5}}$	**M1**	
	$\frac{1}{24}(5x+2)^{\frac{8}{5}}+cx$	**A1**	**FT** on *their c*
	$\frac{26}{3}=\frac{1}{24}(32)^{\frac{8}{5}}+d+((3\times6))$ oe	**M1**	**Dep** for use of $f(6)$ and attempt to evaluate d.
	$[f(x)] =\frac{1}{24}(5x+2)^{\frac{8}{5}}+3x-20$	**A1**	
7(a)(i)	154 440	**B1**	
7(a)(ii)	124 200	**2**	**B1** for ${}^{10}P_5$
	Alternative method		
	124 200	**2**	**B1** for 1 symbol: 75 600 2 symbols: 43 200 3 symbols: 5400
7(b)	$16(n-11)=12(n+1)$ oe	**B2**	**B1** for correct numbers or correct factors must be using combinations
	$n=47$	**B1**	**Dep** on both previous **B** marks Must be the only solution