Question	Answer	Marks	Guidance
9(a)	$\log_5(5x-2)^2 - \log_5 x = 1$ oe	**2**	**B1** for $\log_{25} x = \frac{\log_5 x}{\log_5 25} = \frac{\log_5 x}{2}$ **B1** for $2\log_5(5x-2) = \log_5(5x-2)^2$ oe
	$\log_5 \frac{(5x-2)^2}{x} = 1$	**M1**	**Dep** on one of the previous **B1** For correct use of rules of logarithms e.g. dividing *their* logarithms to the same base Accept $\log_5 5$ for 1
	$25x^2 - 25x + 4 = 0$ oe	**M1**	**Dep M1** for forming a 3-term quadratic equation, with an attempt to solve must have at least 2 **B** marks
	$x = \frac{4}{5}$ only	**A1**	
	Alternative method 1		
	$\log_{25}(5x-2)^2 - \log_{25} x = \frac{1}{2}$	**(2)**	**B1** for $\log_5(5x-2) = \frac{\log_{25}(5x-2)}{\log_{25} 5} = \frac{\log_{25}(5x-2)}{\frac{1}{2}}$ oe **B1** for $\frac{1}{2} = \log_{25} 5$ or for $\frac{1}{2} = \frac{1}{2}\log_{25} 25$ soi
	$\log_{25} \frac{(5x-2)^2}{x} = \frac{1}{2}$ or $\log_{25}(5x-2) = \frac{1}{2}\log_{25} 5x$	**(M1)**	**Dep** on one of the previous **B1** For correct use of rules of logarithms e.g. dividing *their* logarithms to the same base or multiplying Accept $\log_{25} 5$ for $\frac{1}{2}$
	$25x^2 - 25x + 4 = 0$ oe	**(M1)**	**Dep M1** for forming a 3-term quadratic equation, with an attempt to solve must have at least 2 **B** marks
	$x = \frac{4}{5}$ only	**(A1)**	

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Question	Answer	Marks	Guidance
9(a)	**Alternative method 2**		
	$\log_5(5x-2)-\frac{1}{2}\log_5 x=\frac{1}{2}$ Leading to $\log_5\frac{(5x-2)}{\sqrt{x}}=\log_5\sqrt{5}$	**(2)**	**B1** for $\log_{25}x=\frac{1}{2}\log_5 x$ soi **B1** for $\frac{1}{2}=\log_5\sqrt{5}$ soi
	$\frac{(5x-2)^2}{x}=5$ or $(5x-2)=\sqrt{5x}$	**(M1)**	**Dep** on one of the previous **B1** For correct use of rules of logarithms e.g. dividing *their* logarithms to the same base Accept $\log_{25}5$ for $\frac{1}{2}$
	$25x^2-25x+4=0$ or $5x-\sqrt{5}\sqrt{x}-2=0$	**(M1)**	**Dep M1** for forming a 3-term quadratic equation, with an attempt to solve must have at least 2 **B** marks
	$x=\frac{4}{5}$ only	**(A1)**	
	Alternative method 3		
	$\frac{\log(5x-2)}{\log 5}-\frac{\log x}{2\log 5}=\frac{1}{2}$ Leading to $\log\frac{(5x-2)^2}{x}=\log 5$	**(2)**	**B1** for $\log_5(5x-2)=\frac{\log(5x-2)}{\log 5}$ soi **B1** for $\log_{25}x=\frac{\log x}{2\log 5}$ soi
	$\frac{(5x-2)^2}{x}=5$	**(M1)**	**Dep** on one of the previous **B1** For correct use of rules of logarithms e.g. dividing *their* logarithms to the same base
	$25x^2-25x+4=0$	**(M1)**	**Dep M1** for forming a 3-term quadratic equation, with an attempt to solve must have at least 2 **B** marks
	$x=\frac{4}{5}$ only	**(A1)**	

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Question	Answer	Marks	Guidance
9(b)	$e^{3y-7+3y-1}+4e^{-3+3y-1}=5$ oe or $e^{3y-4+3y-1}+4e^{3y-1}=5e^{3}$ or $e^{3y-7}+\frac{4}{e^{3}}=5e^{1-3y}$ or $e^{6y}+4e^{4+3y}=5e^{8}$ or $\frac{e^{3y}}{e^{7}}+\frac{4}{e^{3}}=\frac{5e}{e^{3y}}$ or $\frac{e^{3y-1}}{e^{6}}+\frac{4}{e^{3}}=\frac{5}{e^{3y-1}}$	**B1**	
	$e^{6y-8}+4e^{3y-4}-5\ [=0]$ or $e^{3y-4}+4-5e^{4-3y}[=0]$ or $e^{-7}\left(e^{3y}\right)^{2}+4e^{-3}e^{3y}-5e[=0]$ or $\left(e^{3y-1}\right)^{2}+4e^{3}e^{3y-1}-5e^{6}[=0]$	**B1**	**Dep** for arranging as 3-term quadratic
	$\left(e^{3y-4}-1\right)\left(e^{3y-4}+5\right)=0$ or $\left(e^{-3}\left(e^{3y}\right)-e\right)\left(e^{-4}\left(e^{3y}\right)+5\right)=0$ or $(e^{3y-1}+5e^{3})(e^{3y-1}-e^{3})=0$	**M1**	**Dep** for an attempt at solution
	$e^{3y-4}=1$ or $e^{3y-1}=e^{3}$	**A1**	
	$3y-4=\ln 1$ oe soi or $3y-1=3$	**A1**	
	$y=\frac{4}{3}$	**A1**	
10(a)	$\frac{20}{2}(2a+19d)=3\times\frac{10}{2}(2a+9d)$ oe	**M1**	
	$20a+190d=30a+135d$ oe	**A1**	Correct removal of brackets
	$a=\frac{11}{2}d$ oe	**A1**	

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