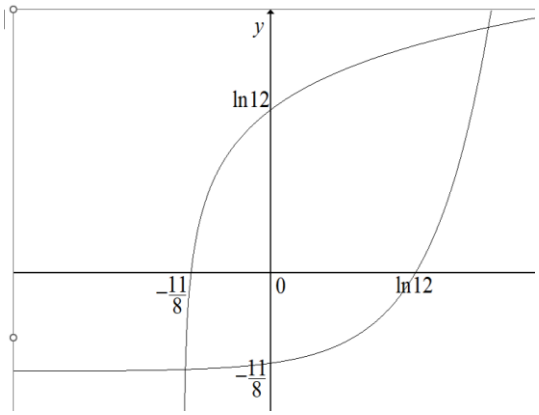
Question	Answer	Marks	Guidance
8(c)	$\ln(8x+12)$ or $\ln(4(2x+3))$	**B1**	May be implied
	$f^{-1}(x)=\frac{e^x-12}{8}$ oe	**2**	**M1** for attempt to find the inverse, allow one sign error **A1** allow y = …
	Range: $f^{-1} > their(-1.5)$	**B1**	Must be correct notation, follow through on *their* **(a)** $f^{-1}(x) > their(-1.5)$, $y > their(-1.5)$
	Alternative		
	$f^{-1}(x)=\frac{e^{x-\ln 4}-3}{2}$ oe	**(3)**	**B1** for $e^{x-\ln 4}$ or $e^{y-\ln 4}$ **M1** for attempt to find the inverse, allow one sign error **A1** allow y = …
	Range: $f^{-1} > their(-1.5)$	**(B1)**	Must be correct notation, follow through on *their* **(a)** $f^{-1}(x) > their(-1.5)$, $y > their(-1.5)$
8(d)		**4**	**B1** for correct shape of $f(x)$ in quadrants 1, 2 and 3, with asymptotic behaviour **B1** for $\ln 12$ and $-\frac{11}{8}$ or -1.375 in correct position, must have a correct shape. **B1** for correct shape of $f^{-1}(x)$ in quadrants 1, 3 and 4, with asymptotic behaviour **B1** for $\ln 12$ and $-\frac{11}{8}$ or -1.375 in correct position, must have a correct shape and intersect at least once with $y=f(x)$
9(a)	$\frac{(4x-1)(2x+1)-(4x-1)+4(2x+1)^2}{(2x+1)^2(4x-1)}$	**M1**	For attempt to obtain a single fraction An extra term of $(2x+1)$ throughout must be dealt with correctly before awarding **M1**
	$\frac{24x^2+14x+4}{(2x+1)^2(4x-1)}$	**A1**	Must see sufficient detail of expansion and collecting terms cso as **AG**

Question	Answer	Marks	Guidance
9(b)	$\frac{1}{2}\ln(2x+1)$	**B1**	
	$\frac{1}{2(2x+1)}$	**B1**	Allow $\frac{-(2x+1)^{-1}}{-1\times 2}$ oe
	$\ln(4x-1)$	**B1**	
	$\left(\frac{1}{2}\ln 3+\frac{1}{6}+\ln 3\right)-\left(\frac{1}{2}\ln 2+\frac{1}{4}\right)$	**M1**	For correct application of limits, must have at least one log term. Must be using individual fractions from **(a)** Fractions and log terms must be bracketed correctly and manipulated correctly
	$\frac{1}{2}\ln\frac{27}{2}-\frac{1}{12}$	**3**	**M1** for application of log laws using $\frac{1}{2}\ln 3+\ln 3-\frac{1}{2}\ln 2$ to obtain the correct form **A1** for $\frac{1}{2}\ln\frac{27}{2}$ **B1** for $-\frac{1}{12}$
10(a)	Common difference = $4\lg x$	**B1**	
	Sum to n terms = $\frac{n}{2}\left(2\lg x+(n-1)(4\lg x)\right)$	**M1**	For use of the sum formula with *their* common difference
	$n(2n-1)\lg x$	**2**	**Dep M1** for a correct attempt to rearrange to the required form **A1** cao
10(b)	$n(2n-1)=4950$	**M1**	For $n((\textit{their } p)n-1)=4950$ together with an attempt to solve to obtain n
	50	**A1**	cao
10(c)	$50(99)\lg x=-14850$	**M1**	For use of *their* n and p in a complete method to find x or use of part **(b)**
	10^{-3} or equivalent	**A1**	