Question Number	Scheme	Notes	Marks
1	$7\cosh x+3\sinh x=2e^{x}+7\Rightarrow$ $7\left(\frac{e^{x}+e^{-x}}{2}\right)+3\left(\frac{e^{x}-e^{-x}}{2}\right)=2e^{x}+7$ $\left\{\frac{7}{2}e^{x}+\frac{7}{2}e^{-x}+\frac{3}{2}e^{x}-\frac{3}{2}e^{-x}=2e^{x}+7\right\}$	Substitutes at least one correct exponential form for either of the hyperbolic terms and achieves an **equation** in exponentials and constants alone	M1
	$\Rightarrow 7\left(e^{2x}+1\right)+3\left(e^{2x}-1\right)=4e^{2x}+14e^{x}$ $\left\{\Rightarrow 5e^{2x}+2=2e^{2x}+7e^{x}\right\}$	Multiplies through by e^{x} to obtain any equation that would form a 3TQ in e^{x} if like terms were collected	M1
	$\Rightarrow 6e^{2x}-14e^{x}+4=0\quad\left\{3e^{2x}-7e^{x}+2=0\right\}$	A correct three term quadratic in e^{x}. Could be implied by a correct root even if terms have not been collected.	A1
	$\Rightarrow\left(3e^{x}-1\right)\left(e^{x}-2\right)=0\Rightarrow e^{x}=...$	Solves their 3TQ - usual rules. One correct root for their quadratic if no working. Ignore labelling of the roots even if e.g.,"x" is used.	M1
	$x=\ln 2,\ \ln\frac{1}{3}$	Both correct and simplified but do not isw if there are **other answers.** Allow $-\ln\frac{1}{2}$ for ln 2 and –ln 3 or $\ln 3^{-1}$ for $\ln\frac{1}{3}$	A1
	Answer only is 0/5		**Total 5**
	Note that it is possible to multiply through by e^{-x} to form an equation in e^{-2x}, e^{-x} and constants. Score as main scheme, e.g., $\frac{7}{2}e^{x}+\frac{7}{2}e^{-x}+\frac{3}{2}e^{x}-\frac{3}{2}e^{-x}=2e^{x}+7$ $\Rightarrow\frac{7}{2}+\frac{7}{2}e^{-2x}+\frac{3}{2}-\frac{3}{2}e^{-2x}=2+7e^{-x}$ (M1) $\Rightarrow 2e^{-2x}-7e^{-x}+3=0$ (A1) $\left(2e^{-x}-1\right)\left(e^{-x}-3\right)=0\Rightarrow e^{-x}=\frac{1}{2},\ 3$ (M1) $\Rightarrow e^{x}=2,\ \frac{1}{3}\ \Rightarrow x=\ln 2,\ \ln\frac{1}{3}$ (A1)		