[2] $\sinh 3x$

$= \sinh(2x+x)$

$= \sinh 2x \cosh x + \cosh 2x \sinh x$ (1) ← [2][a]

$= (2\sinh x \cosh x)\cosh x + (1+2\sinh^2 x)\sinh x$ (1) (1)

↳ [1][e] ↳ [4][b][ii]

$= 2\sinh x \cosh^2 x + \sinh x + 2\sinh^3 x$

$= 2\sinh x (1+\sinh^2 x) + \sinh x + 2\sinh^3 x$ ($\frac{1}{2}$)

↳ [4][a][ii]

$= 3\sinh x + 4\sinh^3 x$ ($\frac{1}{2}$)

[3] [a] $\frac{2}{e^{-3\ln x}+e^{3\ln x}} = \frac{2}{x^{-3}+x^3}\cdot\frac{x^3}{x^3} = \frac{2x^3}{1+x^6}$ (½) (1) (½)

[b] $\frac{e^{2(\frac{1}{4}\ln 25)}-1}{e^{2(\frac{1}{4}\ln 25)}+1} = \frac{e^{\frac{1}{2}\ln 25}-1}{e^{\frac{1}{2}\ln 25}+1} = \frac{e^{\ln 5}-1}{e^{\ln 5}+1} = \frac{5-1}{5+1} = \frac{4}{6} = \frac{2}{3}$ (½) (½) (½) (½)

$\frac{1}{2}\ln 25 = \ln 25^{\frac{1}{2}} = \ln\sqrt{25} = \ln 5$

[4] [a] [i] $(-\infty, \infty)$ (½)

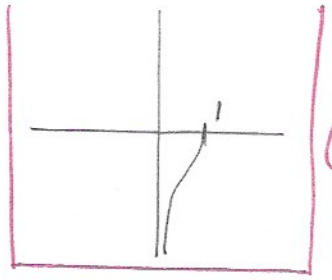
[ii] $(0, 1]$ (½)

[iii] NO – YOU CAN DRAW A HORIZONTAL LINE (eg. $y = \frac{1}{2}$) THAT CROSSES THE GRAPH MORE THAN ONCE (½)

[iv] EVEN – SYMMETRIC OVER y-AXIS (½)

[v] 0 (½)

[b]



(1½)

[5][a] $\boxed{1-\tanh^2 x = \operatorname{sech}^2 x}$ ($\frac{1}{2}$) ← [4][c][i]

$\operatorname{sech}^2 x = 1-\left(-\frac{4}{7}\right)^2$

$= 1-\frac{16}{49}$

$= \boxed{\frac{33}{49}}$ ($\frac{1}{2}$)

$\operatorname{sech} x = \boxed{\pm\frac{\sqrt{33}}{7}}$ ($\frac{1}{2}$) BUT $\operatorname{sech} x > 0$ FROM GRAPH IN QUESTION [4] OF THIS QUIZ

$\operatorname{sech} x = \boxed{\frac{\sqrt{33}}{7}}$ ($\frac{1}{2}$) $= \frac{1}{\cosh x}$ ← [3][d]

$\cosh x = \frac{7}{\sqrt{33}} \cdot \frac{\sqrt{33}}{\sqrt{33}} = \boxed{\frac{7\sqrt{33}}{33}}$ ($\frac{1}{2}$)

[b] $\boxed{\cosh 2x = 2\cosh^2 x - 1}$ ($\frac{1}{2}$) [4][b][i]

$= 2\left(\frac{7}{\sqrt{33}}\right)^2 - 1$

$= 2 \cdot \frac{49}{33} - 1$

$= \frac{98}{33} - 1$

$= \boxed{\frac{65}{33}}$ (1)