[3][f][iv]

$$\operatorname{csch}\left(\tfrac{1}{2}\ln 7\right)$$

$$= \operatorname{csch}\left(\ln \sqrt{7}\right)$$

$$= \frac{2}{e^{\ln\sqrt{7}} - e^{-\ln\sqrt{7}}}$$

$$= \frac{2}{\sqrt{7} - \frac{1}{\sqrt{7}}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$$

$$= \frac{2\sqrt{7}}{7-1}$$

$$= \frac{2\sqrt{7}}{6}$$

$$= \frac{\sqrt{7}}{3}$$

$$\tfrac{1}{2}\ln 7 = \ln 7^{\frac{1}{2}}$$

$$= \ln \sqrt{7}$$

$\ln a^b = b \ln a$

$$\operatorname{csch} x = \frac{1}{\sinh x}$$

$$= \frac{1}{\frac{e^x - e^{-x}}{2}}$$

$$= \frac{2}{e^x - e^{-x}}$$

[4]

FROM [1][d] $\cosh^2 x - \sinh^2 x = 1$

PYTHAGOREAN-LIKE IDENTITY

[a][i] $\cosh^2 x = 1 + \sinh^2 x$

[i] $-\sinh^2 x = 1 - \cosh^2 x$

$\sinh^2 x = \cosh^2 x - 1$

$\cos^2 x = 1 - \sin^2 x$

$\sin^2 x = 1 - \cos^2 x$

FROM [1][c] $\cosh^2 x + \sinh^2 x = \cosh 2x$

[b][i] $\cosh^2 x + \cosh^2 x - 1 = \cosh 2x$

$\cosh 2x = 2\cosh^2 x - 1$ $\quad \cos 2x = 2\cos^2 x - 1$

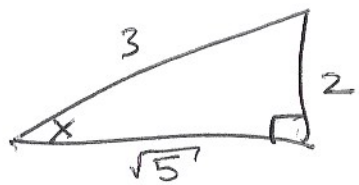
[c][i] $\dfrac{\cosh^2 x - \sinh^2 x}{\sinh^2 x} = \dfrac{1}{\sinh^2 x}$

$\coth^2 x - 1 = \operatorname{csch}^2 x$ $\quad \csc^2 x = \cot^2 x + 1$

REMEMBER QUESTIONS FROM TRIG LIKE:

IF $\sin x = \frac{2}{3}$ AND $x \in [0, \frac{\pi}{2}]$, FIND $\cos x$, $\tan x$, $\csc x$...

$\frac{\text{OPP}}{\text{HYP}}$



$\cos x = \frac{\text{ADJ}}{\text{HYP}} = \frac{\sqrt{5}}{3}$ ...

[4][d] GIVEN $\sinh x = \frac{1}{2}$, FIND ALL OTHER HYPERBOLIC FUNCTION VALUES OF x

$$\operatorname{csch} x = \frac{1}{\sinh x} = \frac{1}{\frac{1}{2}} = 2$$

~~$\cosh x$~~ ~~$\operatorname{csch} x$~~
$\tanh x$ ~~$\operatorname{sech} x$~~
$\coth x$

$$\cosh^2 x - \sinh^2 x = 1$$
$$\cosh^2 x - \left(\frac{1}{2}\right)^2 = 1$$
$$\cosh^2 x = \frac{5}{4}$$
$$\cosh x = \pm\sqrt{\frac{5}{4}} = \pm\frac{\sqrt{5}}{2}$$

$\sqrt{y^2} = \sqrt{9} \rightarrow y = \pm 3$

$$\cosh^2 x - \frac{1}{4} = 1$$
$$\cosh^2 x = 1 + \frac{1}{4} = \frac{5}{4}$$

FROM [0][d]
$\cosh x > 0$ FOR ALL $x \in \mathbb{R}$

$$\cosh x = \frac{\sqrt{5}}{2}$$

$$\operatorname{sech} x = \frac{1}{\cosh x} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

$$\tanh x = \frac{\sinh x}{\cosh x} = \frac{\frac{1}{2}}{\frac{\sqrt{5}}{2}} \cdot \frac{2}{2} = \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$$

$$\coth x = \frac{1}{\tanh x} = \frac{1}{\frac{1}{\sqrt{5}}} = \sqrt{5}$$

[5]

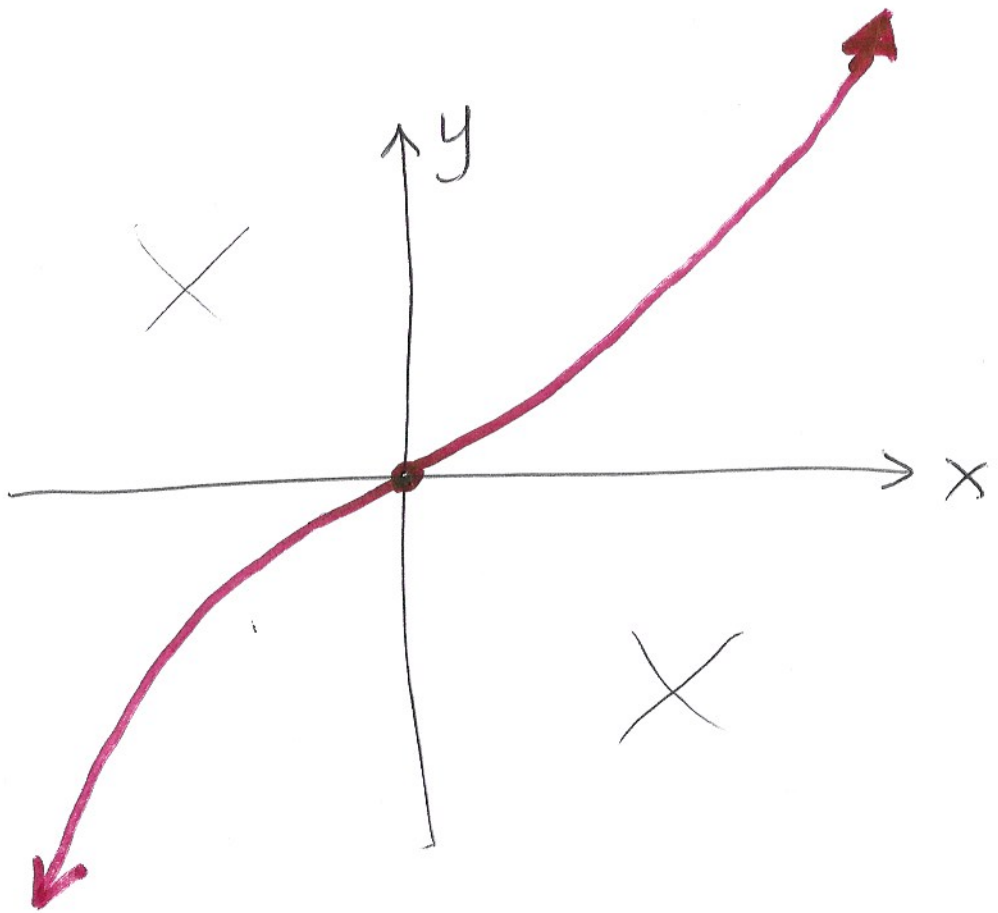
[0][a] $\sinh 0 = 0 \longrightarrow$ y-INT $= 0$

[0][c] $\sinh x = 0$ ONLY IF $x = 0 \longrightarrow$ ONLY X-INT $= 0$

[0][d] IF $x > 0$, THEN $\sinh x > 0 \rightarrow$ PART OF GRAPH IN Q_1

IF $x < 0$, THEN $\sinh x < 0 \rightarrow$ IN Q_3

SKETCH GRAPH OF $y = \sinh x$



[1][a] $\sinh(-x) = -\sinh$

ODD

GRAPH IS SYM

OVER ORIGIN

[0][e]

AS $x \rightarrow \infty$

$\sinh x \rightarrow \infty$

DO UP TO [5][f]