

$$[0][a] \sinh 0 = \frac{e^0 - e^0}{2} = \frac{1-1}{2} = 0 = \sin 0$$

$$\cosh 0 = \frac{e^0 + e^0}{2} = \frac{1+1}{2} = 1 = \cos 0$$

[b] DOMAIN OF $\sinh x$

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

R

DOMAIN OF $e^x = \mathbb{R}$ OR $(-\infty, \infty)$

DOMAIN OF $e^{-x} = \mathbb{R}$ OR $(-\infty, \infty)$

DOMAIN OF $e^x - e^{-x} = (-\infty, \infty)$

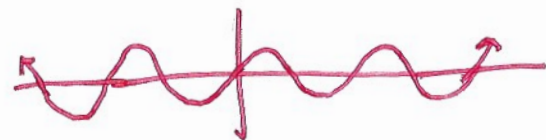
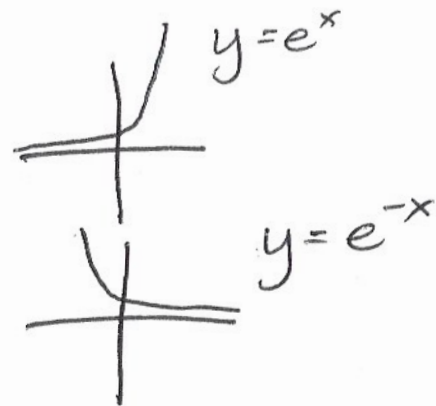
↓

OVERLAP BETWEEN DOMAINS OF e^x, e^{-x}

DOMAIN OF $\sinh x = \text{DOMAIN OF } \frac{e^x - e^{-x}}{2}$

$= (-\infty, \infty)$

DOMAIN OF $\sin x = (-\infty, \infty)$



[c] SOLVE $\sinh x = 0$

$$2. \frac{e^x - e^{-x}}{2} = 0 \quad 2$$

$$e^x - e^{-x} = 0$$

$$e^x = e^{-x}$$

$$e^x \cdot e^x = \frac{1}{e^x} \cdot e^x$$

$$e^{2x} = 1$$

$$\ln e^{2x} = \ln 1$$

$$2x = 0$$

$$\underline{e^x \neq 0}$$

IN FACT
 $e^x > 0$

$\ln 1 = 0$ BECAUSE $\log_e 1 = 0$
BECAUSE $e^0 = 1$

$\ln x = y \iff \log_e x = y$
 $\iff e^y = x$

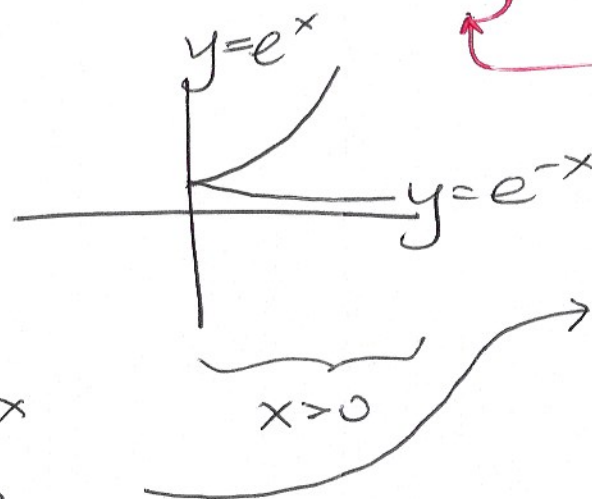
[d] IF $x > 0$

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

~~TO GET A RESULT~~

$$e^x > e^{-x}$$

$$e^x - e^{-x} > 0$$



$$\frac{e^x - e^{-x}}{2} > 0$$
$$\sinh x > 0$$