202 §6.3 #55 redux

(55) $f(x) = \sqrt{3-e^{2x}}$

$\mathcal{D} = \{x \mid 3-e^{2x} \geq 0\} = (-\infty, \frac{\ln 3}{2})$

$-e^{2x} \geq -3$

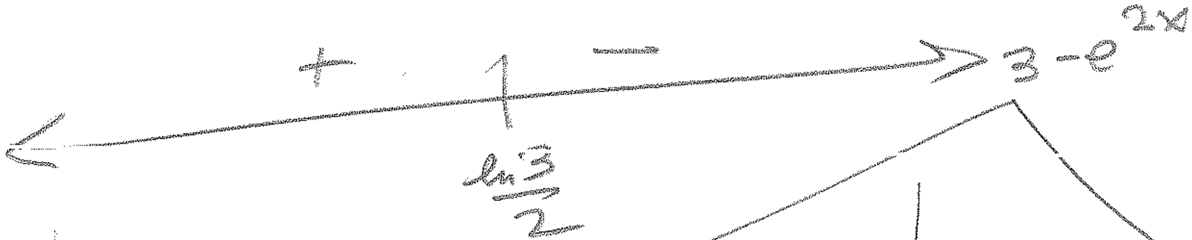
$e^{2x} \leq 3$

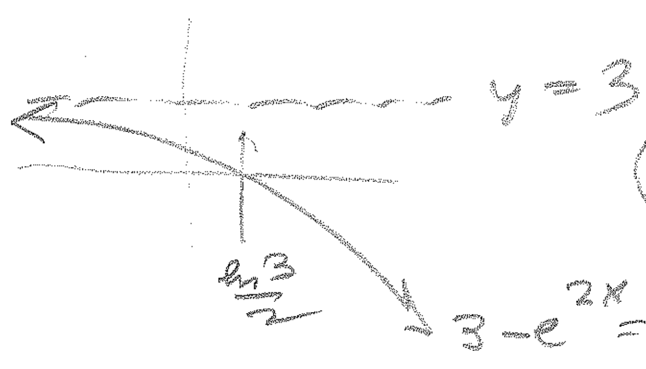
$2x \leq \ln 3$

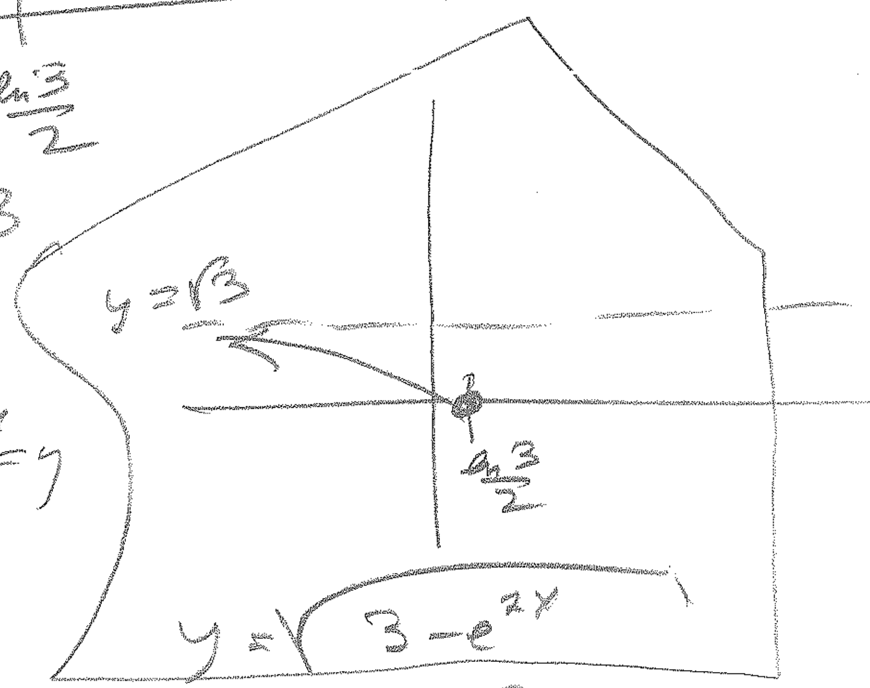
$x \leq \frac{\ln 3}{2}$

NOTE

$\mathcal{R}(f) =$




Note its $\mathcal{R}$ is $[0, \sqrt{3})$.

That should be $\mathcal{D}(f^{-1})$!

202 §6.3 # 55 Redux

55 b Find $f^{-1}$ & its domain.

$$\sqrt{3-e^{2x}} = y$$

$$\sqrt{3-e^{2y}} = x$$

$$3-e^{2y} = x^2$$

$$-e^{2y} = x^2-3$$

$$e^{2y} = 3-x^2$$

$$2y = \ln(3-x^2)$$

$$\boxed{f^{-1}(x) = y = \frac{\ln(3-x^2)}{2}} \quad \left( = \ln\sqrt{3-x^2}, \text{ Fwiw} \right)$$

$$\mathcal{D}(f^{-1}) = \{x \mid 3-x^2>0\} = (-\sqrt{3}, \sqrt{3})$$

This isn't 1-to-1. Need to restrict its domain, appropriately. Look @ f(x)'s range. Use THAT for $\mathcal{D}(f^{-1})$

$$\boxed{\mathcal{D}(f^{-1}) = [0, \sqrt{3})}$$

in the context of $f$, $f^{-1}$.