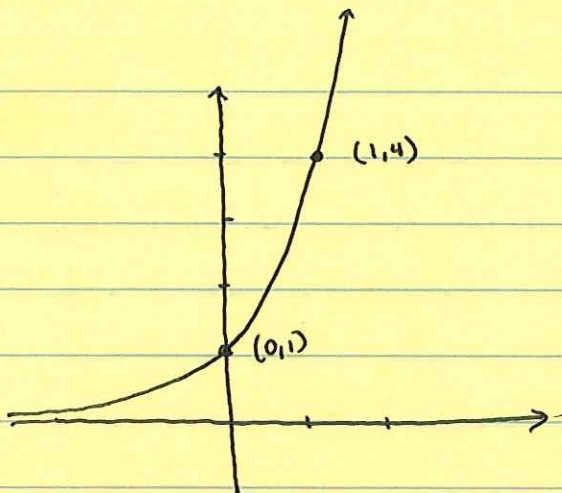
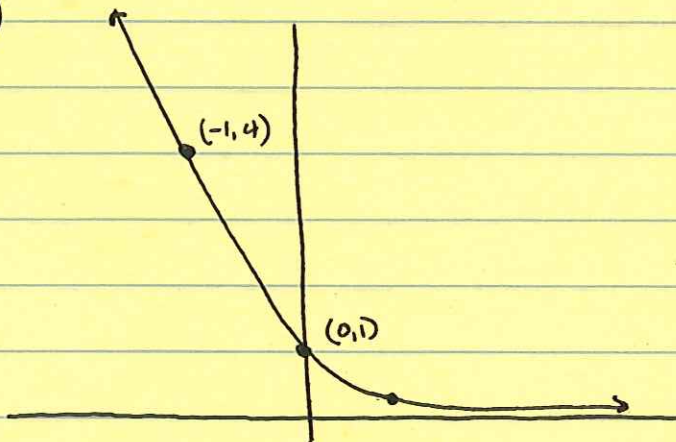


HW 21

5.1.1.) $f(x) = 4^x$



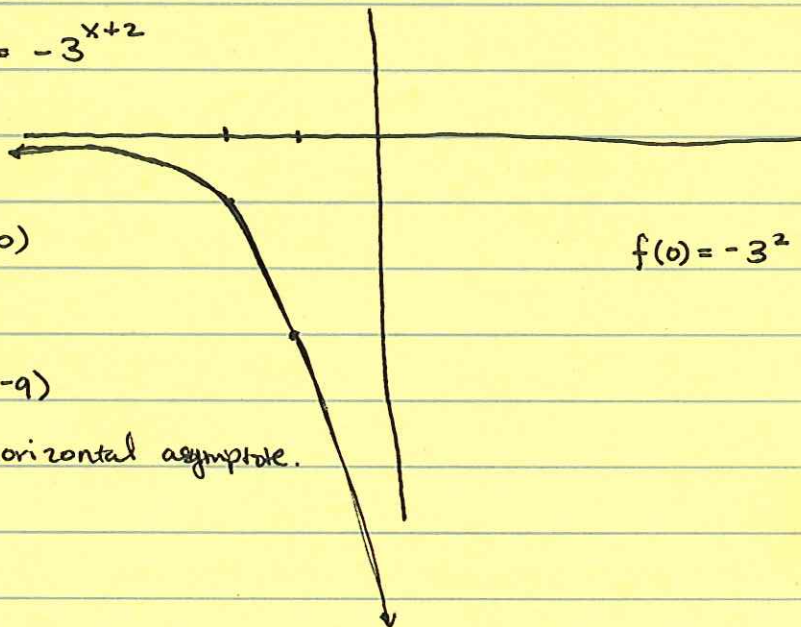
5.1.2.) $f(x) = \left(\frac{1}{4}\right)^x$



5.1.6.)

$f(x) = 10^x$

5.1.15.) $f(x) = -3^{x+2}$



Domain = $(-\infty, \infty)$

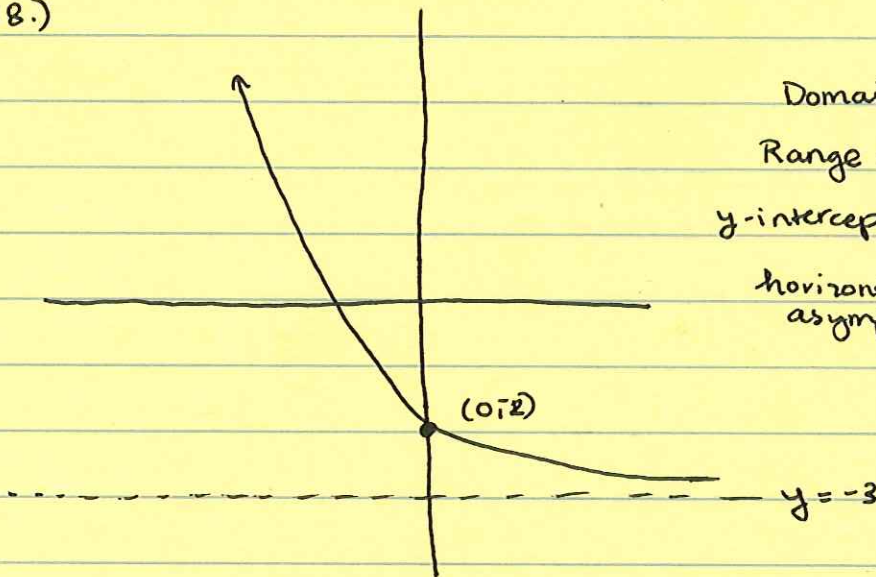
Range = $(-\infty, 0)$

y-intercept: $(0, -9)$

$y = 0$ is the horizontal asymptote.

$f(0) = -3^2 = -9$

5.1.18.)



$$\text{Domain} = (-\infty, \infty)$$

$$\text{Range} = (-3, \infty)$$

$$y\text{-intercept } (0, -2)$$

$$\text{horizontal asymptote } y = -3$$

$$\begin{aligned} 5.1.21.) \quad 2^x &= 16 \\ 2^x &= 2^4 \quad \Rightarrow \boxed{x=4} \end{aligned}$$

$$\begin{aligned} 5.1.22.) \quad 3^{x-1} &= \frac{1}{9} \\ 3^{x-1} &= 9^{-1} \\ 3^{x-1} &= (3^2)^{-1} \\ 3^{x-1} &= 3^{-2} \quad \Rightarrow \quad x-1 = -2 \\ &\quad \quad \quad +1 \quad +1 \\ &\quad \quad \quad \boxed{x = -1} \end{aligned}$$

$$\begin{aligned} 5.1.24.) \quad (\sqrt[3]{3})^x &= 9 \\ (3^{1/3})^x &= 3^2 \\ (3^{x/3}) &= 3^2 \\ \Leftrightarrow \frac{x}{3} &= 2 \quad \Rightarrow \quad \boxed{x=6} \end{aligned}$$