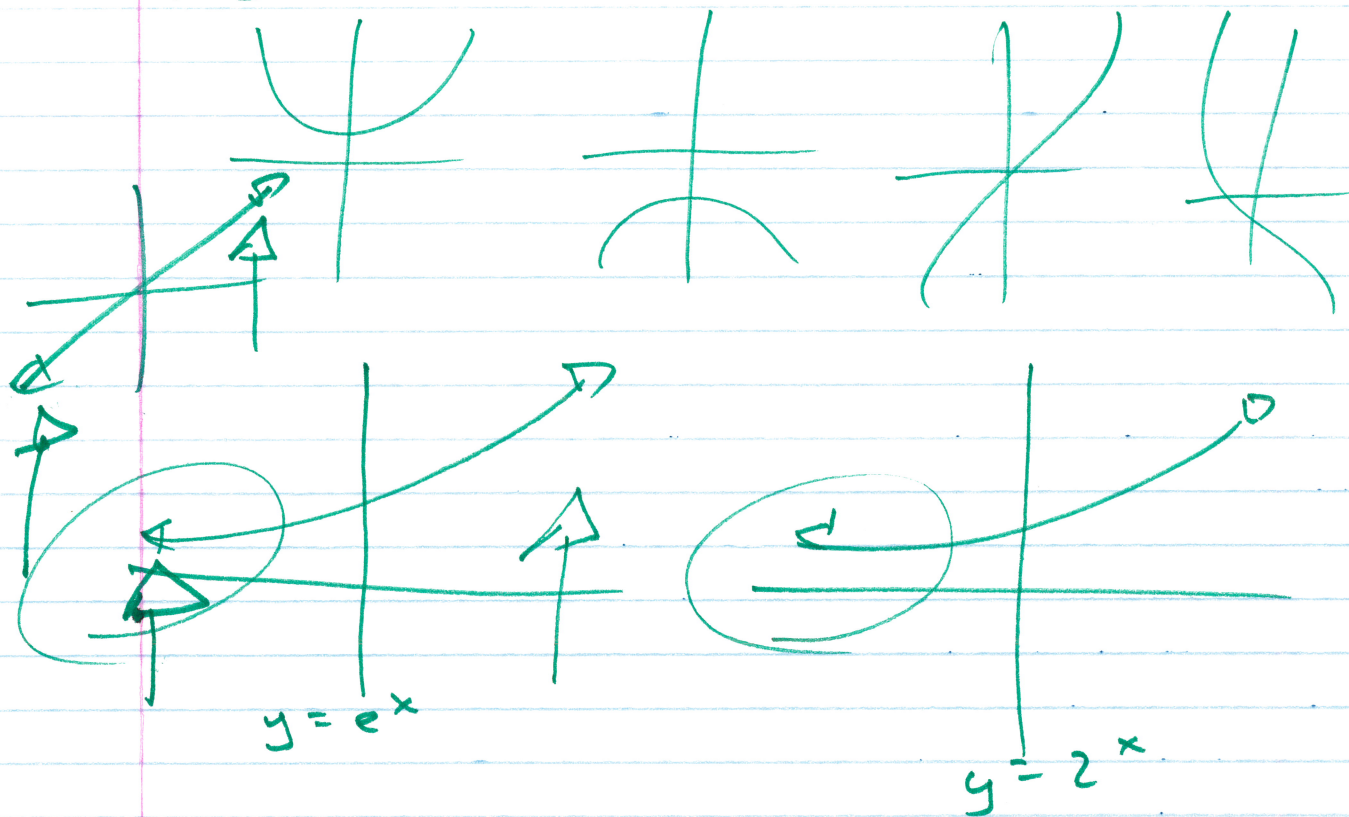
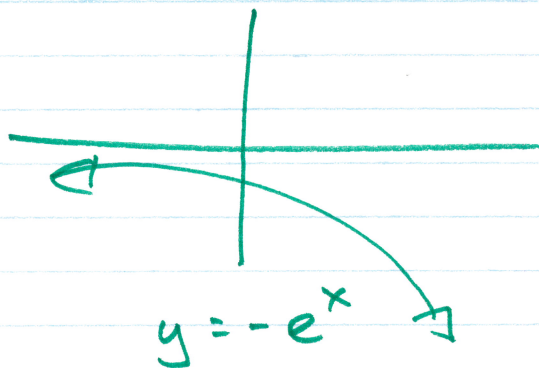
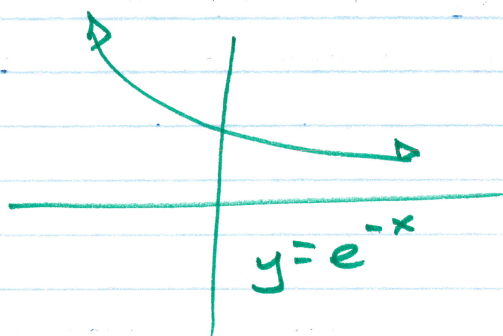


2.2



(45) $y = e^x - 2x$
(a) RIGHT: e^x
(b) LEFT: $-2x$





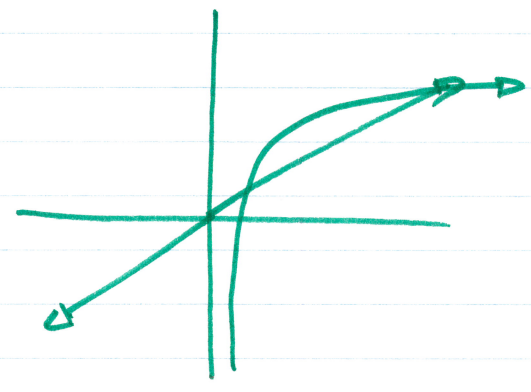
2.2
 (51) $f(x) = \frac{\ln|x|}{x}$

$$\lim_{x \rightarrow \infty} \frac{\ln|x|}{x}$$

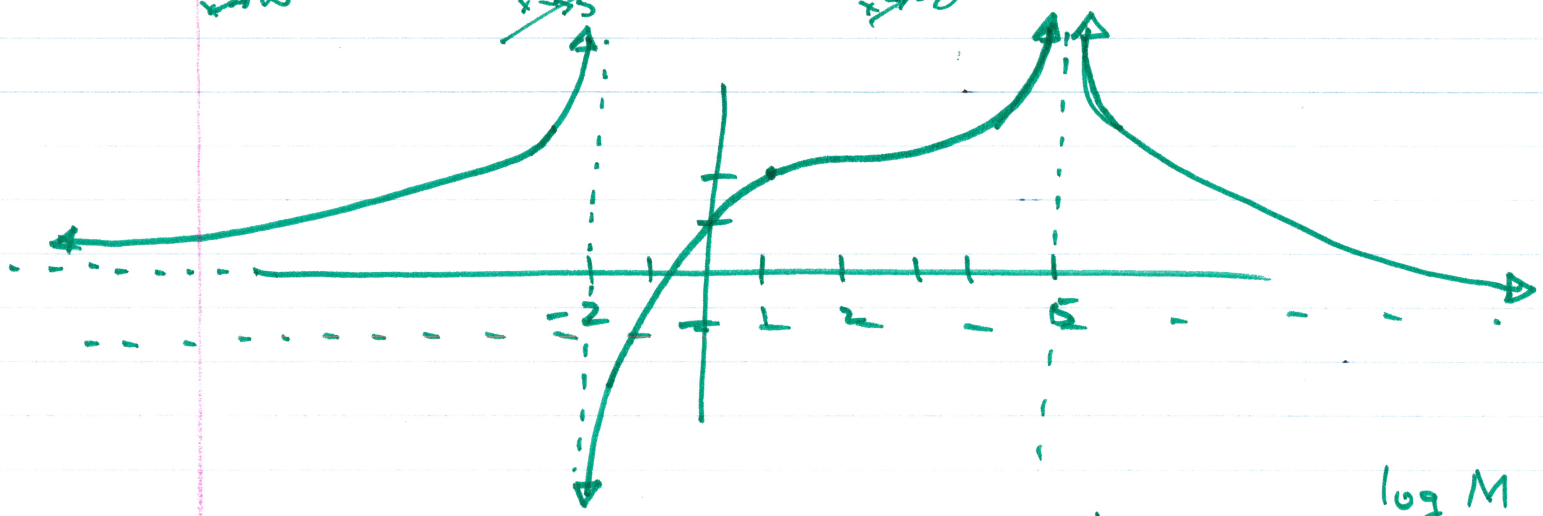
$$\lim_{x \rightarrow 0^+} \frac{\ln|x|}{\frac{1}{x}} = 0$$

$$\lim_{x \rightarrow -\infty} \frac{\ln|x|}{x}$$

$$\lim_{x \rightarrow 0^-} \frac{\ln|x|}{\frac{1}{x}} = 0$$



(55) ~~$\lim_{x \rightarrow 1} f(x) = 2$~~ ~~$\lim_{x \rightarrow 2^-} f(x) = \infty$~~ ~~$\lim_{x \rightarrow 2^+} f(x) = -\infty$~~ ~~$\lim_{x \rightarrow 5^+} f(x) = \infty$~~
 ~~$\lim_{x \rightarrow \infty} f(x) = -1$~~ ~~$\lim_{x \rightarrow 5^-} f(x) = \infty$~~ ~~$\lim_{x \rightarrow -0} f(x) = 0$~~



(70) $\lim_{x \rightarrow \infty} \frac{\ln x}{\log x}$

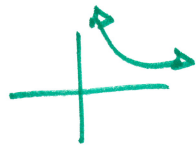
$$\lim_{x \rightarrow \infty} \frac{\ln x}{\frac{\ln x}{\ln 10}}$$

$$\lim_{x \rightarrow \infty} \frac{\ln x}{\ln x} \cdot \frac{\ln 10}{\ln 10}$$

$$\lim_{x \rightarrow \infty} \ln 10 = \ln 10$$

$$\log_b M = \frac{\log M}{\log b}$$
~~$$\log_b M = \frac{\ln M}{\ln b}$$~~

$$\log_{10} x = \frac{\ln x}{\ln 10}$$



$$\frac{x}{x} = \frac{-\infty}{-\infty}$$

2.2

(21) $y = \left(2 - \frac{x}{x+1}\right) \left(\frac{x^2}{5+x^2}\right)$

$$\lim_{x \rightarrow -\infty} \left(2 - \frac{x}{x+1}\right) \left(\frac{x^2}{5+x^2}\right)$$

$$\lim_{x \rightarrow \infty} \left(2 - \frac{x}{x+1}\right) \left(\frac{x^2}{5+x^2}\right)$$

$$\left(2 - \frac{1}{1}\right) (1) = 1$$

$$(2-1)(1) = 1$$

(23) $y = \frac{\cos\left(\frac{1}{x}\right)}{1 + \frac{1}{x}}$

$$\lim_{x \rightarrow \infty} \frac{\cos\left(\frac{1}{x}\right)}{1 + \frac{1}{x}} = \frac{1}{1} = 1$$

$$\lim_{x \rightarrow -\infty} \frac{\cos\left(\frac{1}{x}\right)}{1 + \frac{1}{x}} = 1$$

(27) $f(x) = \frac{1}{x^2 - 4}$

$$\lim_{x \rightarrow 2^-} = -\infty$$

$$\lim_{x \rightarrow -2^-} = \infty$$

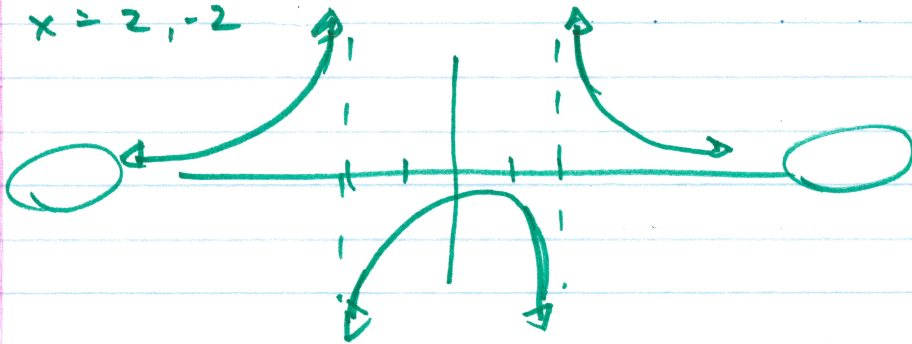
$$x^2 - 4 = 0$$

$$(x-2)(x+2) = 0$$

$$x = 2, -2$$

$$\lim_{x \rightarrow 2^+} = \infty$$

$$\lim_{x \rightarrow -2^+} = -\infty$$



HORIZONTAL ASYMPTOTES

$$\frac{x^2 + 3x + 7}{2x^2 - 2x + 1}$$

$$\lim_{x \rightarrow \infty} \frac{1}{2}$$

$$\lim_{x \rightarrow -\infty} \frac{1}{2}$$

