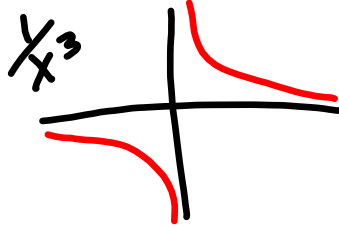
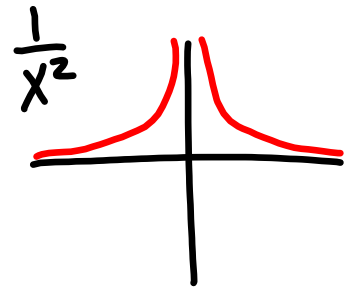
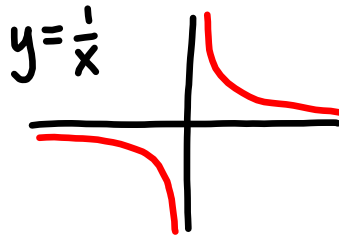
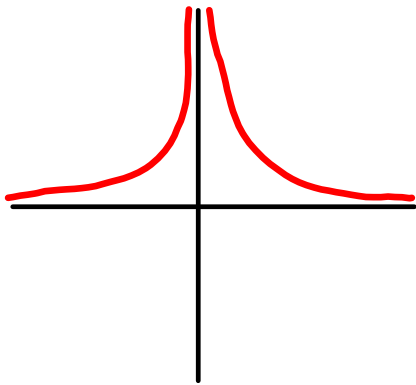
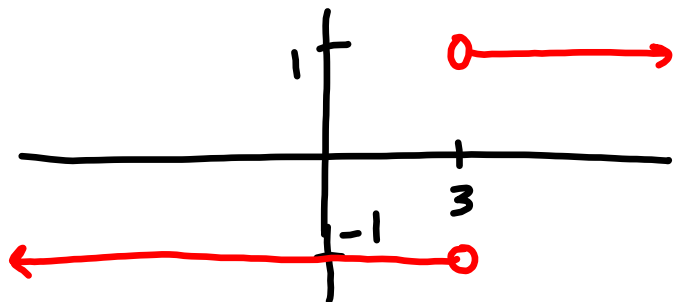


$$\lim_{x \rightarrow 0} \frac{1}{x^4} = \infty$$



$$\lim_{x \rightarrow 3} \frac{|x-3|}{x-3} \text{ does not exist}$$

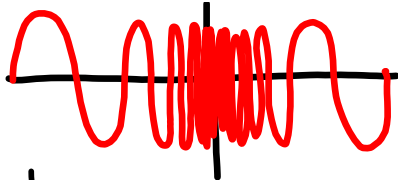
$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$



$$\frac{|x-3|}{x-3} = \begin{cases} \frac{x-3}{x-3} = 1, & x-3 > 0 \\ & x > 3 \\ -\frac{(x-3)}{x-3} = -1, & x-3 < 0 \\ & x < 3 \end{cases}$$

$$\lim_{x \rightarrow 3^-} \frac{|x-3|}{x-3} = -1$$

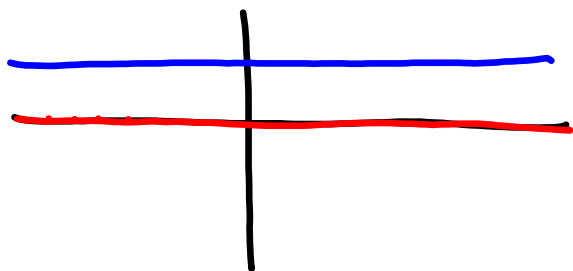
$$\lim_{x \rightarrow 3^+} \frac{|x-3|}{x-3} = 1$$

$\lim_{x \rightarrow 0} \sin \frac{1}{x}$ does not exist 

| | | | | | | |
|--------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| x | $\frac{2}{\pi}$ | $\frac{2}{3\pi}$ | $\frac{2}{5\pi}$ | $\frac{2}{7\pi}$ | $\frac{2}{9\pi}$ | $\frac{2}{11\pi}$ |
| $\sin \frac{1}{x}$ | $\sin \frac{\pi}{2}$ | $\sin \frac{3\pi}{2}$ | $\sin \frac{5\pi}{2}$ | $\sin \frac{7\pi}{2}$ | $\sin \frac{9\pi}{2}$ | $\sin \frac{11\pi}{2}$ |
| | 1 | -1 | 1 | -1 | 1 | -1 |

"Dirichlet Function"

$$f(x) = \begin{cases} 0, & \text{if } x \text{ is rational} \\ 1, & \text{if } x \text{ is irrational} \end{cases}$$



limits do not exist for any x

1.2 p55-56
#1-6 ; 15-24