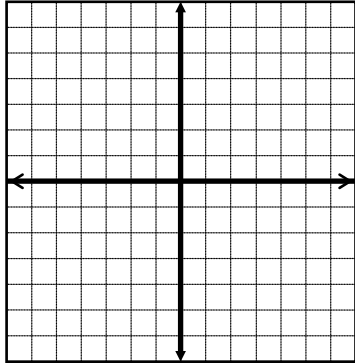


**Notes 42 (2.7) Limits to Infinity**

**Graph the rational function, identify the horizontal asymptote, and find the infinite limit.**

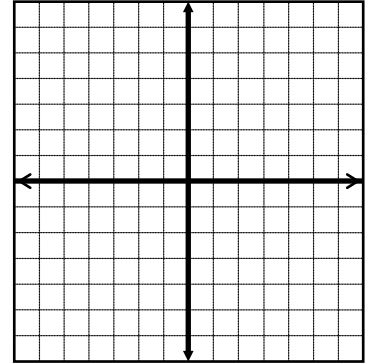
1)  $f(x) = \frac{3x^2 - x}{x^2 - x - 6}$



$\lim_{x \rightarrow \infty} f(x)$

$\lim_{x \rightarrow -\infty} f(x)$

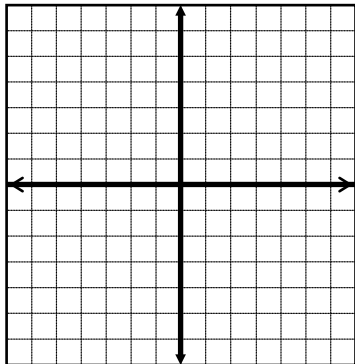
2)  $f(x) = \frac{x^2 + 2x - 8}{x^2 - 4}$



$\lim_{x \rightarrow \infty} f(x)$

$\lim_{x \rightarrow -\infty} f(x)$

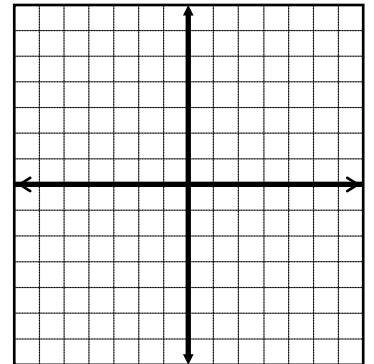
3)  $f(x) = \frac{x^2 - 2x - 3}{x + 2}$



$\lim_{x \rightarrow \infty} f(x)$

$\lim_{x \rightarrow -\infty} f(x)$

4)  $f(x) = \frac{x + 1}{2x^2 - 8}$



$\lim_{x \rightarrow \infty} f(x)$

$\lim_{x \rightarrow -\infty} f(x)$

**What similarities do you notice about the infinite limits? What conclusions can you make?**

Find the infinite limit using limit properties. Compare the answer to the horizontal or special asymptote.

$$5) \lim_{x \rightarrow \infty} \sqrt{\frac{9x^2 - 2}{x^2 + 3x - 1}}$$

$$6) \lim_{x \rightarrow -\infty} \frac{5x - 3}{2x^2 - 3x + 1}$$

$$7) \lim_{x \rightarrow \infty} \frac{2x^2 - 5x}{4x + 1}$$

$$8) \lim_{x \rightarrow \infty} \frac{x + 4}{2x^2 - 3x + 1}$$

Find the other types of infinite limits.

$$9) \lim_{x \rightarrow -\infty} (x^2 - x^5)$$

$$10) \lim_{x \rightarrow \infty} \frac{4x^3 - 2x + 1}{x + 3}$$