Limits at Infinity

$x \to \infty$

$x \to -\infty$

$\frac{B}{B^2}$ $\frac{1}{B}$

$$\lim_{x \to \infty} \frac{1}{x} = 0$$

$$\lim_{x \to \infty} \frac{x}{x^2} = 0$$

$$\lim_{x \to \infty} \frac{5}{x} = 0$$

$$\lim_{x \to \infty} \frac{x^2}{x^3} = 0$$

$$\lim_{x \to \infty} \frac{x^{17} - 4}{x^{270} - 16x}$$

$°N < °D \to$

$$\lim_{x \to \infty} \frac{5x+3}{7} = +\infty$$

$$\frac{5B}{7}$$

$$\lim_{x \to -\infty} \frac{3x-4}{5} = -\infty$$

$$\frac{3(-B)}{5}$$

$$\frac{-3B}{5}$$

$$\lim_{x \to -\infty} \frac{x^2+5x-11}{7x+2} = -\infty$$

$$\frac{(-B)^2}{-7(B)} \quad \frac{B^2}{-7B}$$

$$-\frac{B}{7}$$

$°N > °D \rightarrow \pm\infty$ (B)

$$\lim_{x\to\infty} \frac{5x+6}{2x-1} = \frac{5}{2}$$

$^{\circ}N = {}^{\circ}D$

$\div$ coefficients of highest degreed terms

$$\frac{5\cancel{x}}{2\cancel{x}}$$

$$\lim_{x\to\infty} \frac{1-2x^2}{5x^2+6} = -\frac{2}{5}$$

$$\frac{-2\cancel{x}^2}{5\cancel{x}^2}$$

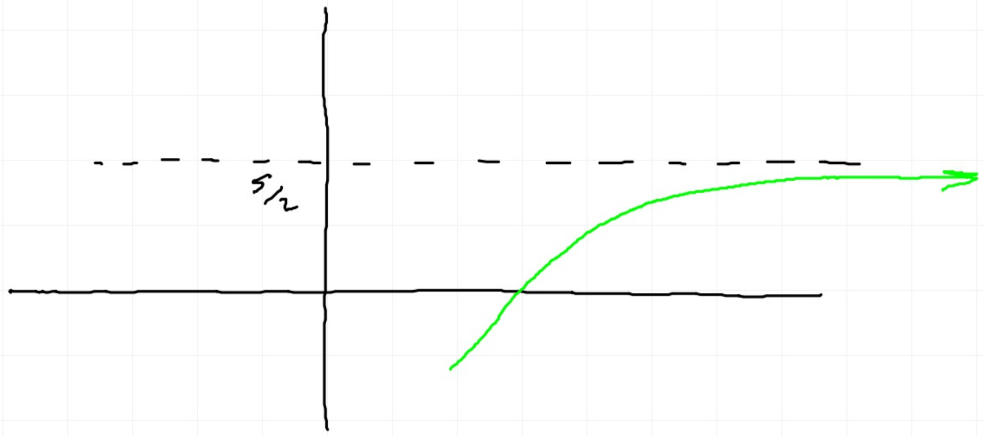
$$\lim_{x\to\infty} \frac{\sqrt{3x^2-6}}{1x-5} = \sqrt{3}$$

$$\frac{\sqrt{3}\,(\cancel{x})}{\cancel{x}}$$

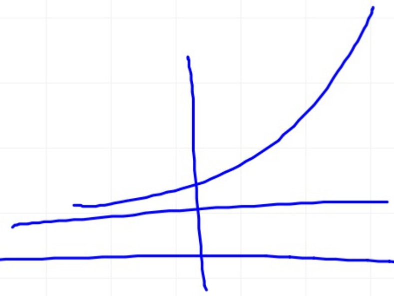
$$\lim_{x\to-\infty} \frac{\sqrt{3x^2-6}}{x-5} = -\sqrt{3}$$

$$\frac{\sqrt{3}\sqrt{(-x)^2}}{(-x)} \quad \frac{\sqrt{3}\cancel{x}}{-\cancel{x}}$$

$$\lim_{x \to \infty} \frac{5x+4}{2x-1} = \frac{5}{2}$$



$$f(x) = \frac{5x-2}{3x+1}$$



<u>HA</u>

f has a HA at $y=b$ iff $\lim\limits_{x \to \pm\infty} f(x) = b$.

Find HA (if any) of $f(x) = \frac{5x-2}{3x+1}$.

f has a HA at $y = \frac{5}{3}$ because $\lim_{x \to \infty} f(x) = \frac{5}{3}$.

f has a HA at $y = \frac{5}{3}$ because $\lim_{x \to -\infty} f(x) = \frac{5}{3}$.

Find the HA (if any) of $f(x) = \dfrac{\sqrt{7x^2-3}}{9x+4}$.

f has a HA at $y = \frac{\sqrt{7}}{9}$ becau[se] $\lim_{x \to \infty} f(x) = \frac{\sqrt{7}}{9}$.

f has HA at $y = -\frac{\sqrt{7}}{9}$ becau[se] $\lim_{x \to -\infty} f(x) = -\frac{\sqrt{7}}{9}$.