Limits at Infinity

$x \to \infty \qquad x \to -\infty$

$^\circ N < D \to 0$

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

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

$$\frac{3\cancel{B}}{B^{\cancel{2}}}$$

$$\lim_{x \to \infty} \frac{3x^2+5x}{x-170} = +\infty$$

$$\lim_{x \to -\infty} \frac{3x^2+5x}{x-170} = -\infty$$

$°N > °D \rightarrow \nexists \pm\infty$

$$\frac{3B^2}{B} \quad 3B$$

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

$$-3B$$

$$\boxed{\lim_{x \to \infty} \frac{5x+2}{3x-1} = \frac{5}{3}.}$$

$$\lim_{x \to \infty} \frac{\sqrt{3x^2+7x-1}}{8x+5} = \frac{\sqrt{3}}{8}$$

$$\frac{\sqrt{3}\sqrt{\cancel{\beta}^2}}{8\cancel{\beta}}$$

$$\lim_{x \to -\infty} \frac{\sqrt{3x^2+7x-1}}{8x+5} = -\frac{\sqrt{3}}{8}$$

$$\frac{\sqrt{3}\sqrt{(-\beta)^2}}{8(-\beta)}$$

$$\frac{\sqrt{3}\,\cancel{\beta}}{-8\cancel{\beta}}$$

$°N = °D \rightarrow$ divide the coeff. of the highest degree terms.

HA

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

Find the HA (if any) of $f(x) = \frac{8x-2}{3x+1}$.

f has a HA at $y=\frac{8}{3}$ because $\lim_{x\to\infty} f(x) = \frac{8}{3}$.

f has a HA at $y=\frac{8}{3}$ because $\lim_{x\to-\infty} f(x) = \frac{8}{3}$.

2117. Eval $\lim_{x \to \infty} \frac{5x+1}{10x-2}$.

$$\lim_{x \to \infty} \frac{5x+1}{10x-2} = \frac{1}{2}.$$

2118.