Calculus 12
9-3 Horizontal Asymptotes

1. Find the limit.

a) $\lim_{x \to -\infty} 3x^{-5}$

b) $\lim_{x \to \infty} \frac{1-x}{3+5x}$

c) $\lim_{x \to \infty} \frac{2x+1}{x-3}$

d) $\lim_{x \to -\infty} \frac{2x+1}{x-3}$

e) $\lim_{x \to \infty} \frac{x^2-1}{(x+3)(2x+4)}$

f) $\lim_{x \to -\infty} \frac{3x^3+x^2-5}{x^3-4x+1}$

2. Find the horizontal asymptotes of each curve.

a) $y = \frac{2x-3}{5-4x}$

b) $y = 1 - \frac{x}{x^2-2}$

3. Find the horizontal and vertical asymptotes. Use them, together with intercepts, to sketch the graph.

a) $y = \frac{2}{x+1}$

b) $y = \frac{4x+5}{3-2x}$

c) $y = \frac{x}{x^2-1}$

d) $y = \frac{2x^2}{x^2+3x-4}$

4. Find the limit.

a) $\lim_{x \to -\infty} x^5$

b) $\lim_{x \to \infty} \left(x^3 - x^2\right)$

c) $\lim_{x \to \infty} x^2(2x+1)(x-2)$

d) $\lim_{x \to \infty} (x+2)^4(3-x)$