Exercises

5.1 Find the following finite limits:

$$\lim_{x\to 4}\left[x^2-6x+4\right] \qquad \lim_{x\to 0}\left[\frac{x-25}{x+5}\right]$$

$$\lim_{x\to 4}\left[\frac{x^2}{3x-2}\right] \qquad \lim_{y\to 0}\left[\frac{y^4-1}{y-1}\right].$$

5.2 Given

$$\lim_{y\to 0} f(y) = -2 \quad \text{and} \quad \lim_{y\to 0} g(y) = 2,$$

find

$$\lim_{y\to 0}\left[f(y) - 3f(y)g(y)\right].$$

5.3 Find the following infinite limits and graph:

$$\lim_{x\to\infty}\left[\frac{9x^2}{x^2+3}\right] \qquad \lim_{x\to\infty}\left[\frac{3x-4}{x+3}\right] \qquad \lim_{x\to\infty}\left[\frac{2^x-3}{2^x+1}\right].$$

5.4 Marshall and Stahura (1979) modeled racial mixes in U.S. suburbs over a 10-year period and found that changes between white and black proportions can be described with one of two functional forms: linear and quadratic:

Population Change, 1960 to 1970, White (y) as a Function of Black (x), by Suburb Size

Suburb	$y = 0.330 - 0.024x$
Under 25K	$y = 0.295 - 0.102x + 0.033x^2$
Suburb	$y = 0.199 - 0.112x$
25K–50K	$y = 0.193 - 0.144x + 0.103x^2$
Suburb	$y = 0.100 - 0.045x$
Over 50K	$y = 0.084 - 0.114x + 0.026x^2$

Comparing each suburb size separately, which of these two forms implies the greatest instantaneous change in y at $x = 0.5$? What is the interpretation on the minus sign for each coefficient on x and a positive coefficient for each coefficient on x^2?