Basic Properties and Rules for Limits

For any real number c, suppose the functions f and g both have limits at x=c.

Constant $\lim_{x \to c} k = k$ Identity Function $\lim_{x \to c} x = c$ Constant Multiple $\lim_{x \to c} [kf(x)] = k \lim_{x \to c} f(x)$

Sum Rule $\lim_{x \to c} [f(x) + g(x)] = \lim_{x \to c} f(x) + \lim_{x \to c} g(x)$

Difference Rule $\lim_{x \to c} [f(x) - g(x)] = \lim_{x \to c} f(x) - \lim_{x \to c} g(x)$

Product Rule

 $\lim_{x \to c} [f(x)g(x)] = \left(\lim_{x \to c} f(x)\right) \left(\lim_{x \to c} g(x)\right)$

Quotient Rule

$$\lim_{x \to c} \frac{f(x)}{g(x)} = \lim_{\substack{x \to c \\ x \to c}} \frac{f(x)}{g(x)} \quad \underline{\text{provided}} \quad \lim_{x \to c} g(x) \neq 0$$

Algebraic Power

 $\lim_{x \to c} [f(x)]^n = \left[\lim_{x \to c} f(x)\right]^n$