Limit Laws

Building blocks

Constant function:

$$\lim_{x \to c} k = k$$

Identity Function:

$$\lim_{x \to c} x = c$$

Given
$$\lim_{x \to c} f(x) = L \quad \text{and} \quad \lim_{x \to c} g(x) = M$$

$$\left| f(x) - L \right| \le \epsilon \text{ if } \left| x - c \right| \le \delta$$

$$(f + g)(x) = f(x) + g(x) \Rightarrow \lim_{x \to c} \left((f + g)(x) \right) = \lim_{x \to c} \left(f(x) + g(x) \right)$$
$$\lim_{x \to c}(f + g)(x) = \lim_{x \to c} f(x) + \lim_{x \to c} g(x) = L + M$$

$$\lim_{x \to c}(f * g)(x) = \lim_{x \to c} f(x) * \lim_{x \to c} g(x) \text{ (This also includes constant multiplies of the form}$$
$$\lim_{x \to c} cf(x) = c \left(\lim_{x \to c} f(x) \right)$$

$$\lim_{x \to c} f(x)^n = \left(\lim_{x \to c} f(x) \right)^n \text{ for } n \in \mathbb{Q}_{>0}$$

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