

# Properties of Limits

## Theorem 1.1 Basic Limits

Example

$$1. \lim_{x \rightarrow c} b = b$$

$$\lim_{x \rightarrow 2} 3 = 3$$

$$2. \lim_{x \rightarrow c} x = c$$

$$\lim_{x \rightarrow -4} x = -4$$

$$3. \lim_{x \rightarrow c} x^n = c^n$$

$$\lim_{x \rightarrow 2} x^2 = 2^2 = 4$$

## Theorem 1.2 Properties of Limits

Let  $b$  and  $c$  be real numbers, let  $n$  be a positive integer, and let  $f$  and  $g$  be functions with the following limits.

$$\lim_{x \rightarrow c} f(x) = L$$

$$\text{and } \lim_{x \rightarrow c} g(x) = K$$

1. Scalar multiple

$$\lim_{x \rightarrow c} [b \cdot f(x)] = bL$$

2. Sum or difference

$$\lim_{x \rightarrow c} [f(x) \pm g(x)] = L \pm K$$

3. Product

$$\lim_{x \rightarrow c} [f(x) \cdot g(x)] = L \cdot K$$

4. Quotient

$$\lim_{x \rightarrow c} \frac{f(x)}{g(x)} = \frac{L}{K} \text{ provided } K \neq 0$$

5. Power

$$\lim [f(x)]^n = L^n$$

