Math 201
Section 1.2 Computing Limits

Limit Laws Suppose that c is a constant and the limits

$$\lim_{x\to a} f(x) \text{ and } \lim_{x\to a} g(x)$$

exist. Then

1. $$\lim_{x\to a}[f(x)+g(x)] = \lim_{x\to a} f(x) + \lim_{x\to a} g(x)$$

2. $$\lim_{x\to a}[f(x)-g(x)] = \lim_{x\to a} f(x) - \lim_{x\to a} g(x)$$

3. $$\lim_{x\to a}[cf(x)] = c\lim_{x\to a} f(x)$$

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

5. $$\lim_{x\to a}\frac{f(x)}{g(x)} = \frac{\lim_{x\to a} f(x)}{\lim_{x\to a} g(x)} \text{ if } \lim_{x\to a} g(x) \neq 0$$

6. $$\lim_{x\to a}[f(x)]^n = \left[\lim_{x\to a} f(x)\right]^n \text{ where } n \text{ is a positive integer}$$

7. $$\lim_{x\to a} c = c$$

8. $$\lim_{x\to a} x = a$$

9. $$\lim_{x\to a}\sqrt[n]{f(x)} = \sqrt[n]{\lim_{x\to a} f(x)} \text{ where } n \text{ is a positive integer (and } \lim_{x\to a} f(x) > 0 \text{ if } n \text{ is even)}$$

Direct Substitution Property If f is a polynomial or a rational function and a is in the domain of f, then

$$\lim_{x\to a} f(x) = f(a).$$