

11-1 day 2

Basic Limits on page 747.

Properties of Limits on Page 747

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

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

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

4. $\lim_{x \rightarrow c} \sqrt[n]{x} = \sqrt[n]{c}$

1. Scalar Multiple:

$$\lim_{x \rightarrow c} 4(x)$$

2. Sum or Difference:

3. Product:

4. Quotient:

5. Power:

Direct Substitution and Properties of Limits

Find each limit.

A) $\lim_{x \rightarrow 4} x^2 = 4^2 = 16$

B) $\lim_{x \rightarrow 4} 5x = 5(4) = 20$

C) $\lim_{x \rightarrow 9} \sqrt{x} = \sqrt{9} = 3$

D) $\lim_{x \rightarrow \pi} x \cos x = \pi \cos \pi = \pi(-1) = -\pi$

Handwritten work for B: $\lim_{x \rightarrow 4} 5x$ with a box around it, an arrow pointing down to 4, and the calculation $5 \cdot 4 = 20$ next to it.

Limits of Polynomial and Rational Functions

1. $p =$ polynomial, $c =$ real # $\lim_{x \rightarrow c} p(x) = p(c)$

2. $r =$ rational function

$r(x) = \frac{p(x)}{g(x)}$ c is a real number $\lim_{x \rightarrow c} r(x) = r(c) = \frac{p(c)}{g(c)}$

A) $\lim_{x \rightarrow -1} (x^2 + x - 6) = (-1)^2 + -1 - 6 = 1 - 1 - 6 = -6$

B) $\lim_{x \rightarrow -1} \frac{x^2 + x - 6}{x + 3} = \frac{(-1)^2 + -1 - 6}{-1 + 3} = \frac{1 + -1 - 6}{2} = \frac{-6}{2} = -3$