Rules for Limits

Example

Suppose $\lim_{x\to 2} f(x) = 2$ and $\lim_{x\to 2} g(x) = 3$. Use the limit rules to find the following limits.

(a) $\lim_{x\to 2} (f(x) + 4g(x))$

(b) $\lim_{x\to 2} \dfrac{(f(x))^3}{\log_3 g(x)}$

Finding Limits

Example

Find the following limits.

(a) $\lim_{x\to 2} \dfrac{x^2 + x - 1}{\sqrt{x+2}}$

(b) $\lim_{x\to -3} \dfrac{x^2 + x - 6}{x + 3}$

(c) $\lim_{x\to 9} \dfrac{\sqrt{x} - 3}{x - 9}$

(d) $\lim_{x\to 1} \dfrac{x + 1}{x^2 - 1}$

Limits at Infinity

Example

The cost function to manufacture x units of a certain DVD is

$$C(x) = 6x + 15000$$

dollars.

The average cost per DVD, denoted $\overline{C}(x)$, is

$$\overline{C}(x) = \frac{C(x)}{x}.$$

Find and interpret $\lim_{x\to\infty} \overline{C}(x)$.

Limits at Infinity

Example

Find each limit.

(a) $\lim_{x\to\infty} \dfrac{5x-1}{2x+3}$

(b) $\lim_{x\to\infty} \dfrac{5x-1}{x^2+5}$

(c) $\lim_{x\to\infty} \dfrac{3x^2+2}{x^2+x+1}$

(d) $\lim_{x\to\infty} \dfrac{2x^2+1}{2x+3}$

(e) $\lim_{x\to\infty} \dfrac{3x^2-x^3}{x^2+x+1}$