Section 3.2: Continuity
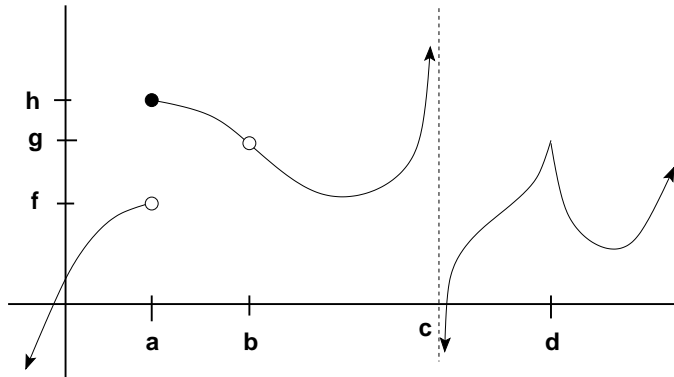
Example: Where is the function $f(x)$ not continuous?

Definition: The function $f(x)$ is said to be **continuous** at $\mathbf{x} = \mathbf{a}$ provided $\lim\limits_{x \to a} f(x) = f(a)$.

Definition: The function $f(x)$ is said to be **continuous on the interval** $(\mathbf{a}, \mathbf{b})$ provided that it is continuous at each number in the interval.

Example: Is $f(x) = x^2 + 5$ continuous at $x = 3$?

Example: Where if $f(x) = \dfrac{x^2 - 4}{x^2 + 7x + 10}$ not continuous(i.e discontinuous)?

Example: Find the interval(s) where $f(x) = \sqrt{x - 5}$ is continuous.

Example: Where is $g(x)$ not continuous?

$$g(x) = \begin{cases} -x + 5 & \text{if } x \leq 2 \\ x^3 - 3x + 4 & \text{if } x > 2 \end{cases}$$

Example: Find the values of A so that $f(x)$ will be continuous.

$$f(x) = \begin{cases} Ax^2 + 5 & \text{if } x \leq 3 \\ Ax - 7 & \text{if } x > 3 \end{cases}$$

Example: Find the values of A and B so that $h(x)$ will be continuous.

$$h(x) = \begin{cases} Ax + 3 & \text{if } x \leq -1 \\ 2x + B^2 & \text{if } -1 < x < 2 \\ 10x & \text{if } x \geq 2 \end{cases}$$