1-8 Videos Guide

1-8a

Definition: (continuous at a)

- A function f is continuous at a number a if $\lim_{x \to a} f(x) = f(a)$.

- Types of discontinuity
- Functions that are continuous

1-8b

Exercise:

- Find values of a and b that make f continuous everywhere.

$$f(x) = \begin{cases} \dfrac{x^2 - 4}{x - 2}, & x < 2 \\ ax^2 - bx + 3, & 2 \leq x < 3 \\ 2x - a + b, & x \geq 3 \end{cases}$$

1-8c

Theorem (statement):

- Intermediate Value Theorem: Suppose f is continuous on the closed interval $[a, b]$ and let N be any number between $f(a)$ and $f(b)$, where $f(a) \neq f(b)$. Then there is a number $c \in (a, b)$ such that $f(c) = N$.

Exercise:

- Use the Intermediate Value Theorem to show that the equation has at least one real solution.

$$\frac{2}{x} = x - \sqrt{x}$$