

Differentiability

- A function has to be continuous at a to be differentiable at a .
- A function that is continuous at a may or may not be differentiable.
- A function that is differentiable, is locally linear.
- The derivative of a function is also a function.

Theorem: Differentiability Implies Continuity.

If f has a derivative at $x=a$, then f is continuous at $x=a$.

Theorem: Intermediate Value Theorem for Derivatives

If a and b are any two points in an interval on which f is differentiable, then $\frac{d}{dx} f(x)$ takes on every value between $\frac{d}{dx} f(a)$ and $\frac{d}{dx} f(b)$.