Unit 4: Derivatives

Vocabulary and notation

$f'(x)$ $\qquad$ $\dfrac{df}{dx}(a)$ $\qquad$ $\dfrac{d}{dx}\left(\ \cdots \ \right)\Big|_{x=a}$ $\qquad$ difference quotient

$f''(x)$ $\qquad$ $\dfrac{d^2 f}{dx^2}$ $\qquad$ differentiable $\qquad$ one-sided differentiable

linear operator $\quad$ marginal effect $\quad$ second derivative $\quad$ point of inflection

secant line

Skills

- Write a derivative as a limit

- Capture word problem information involving derivatives

- Graph the derivative of a function whose graph you are given

- Estimate a derivative from a partial lookup table

- Logical implications between differentiability and continuity

- Compute derivatives from first principles for simple cases: constant, linear, $f(x) := x^2$.

- Units of the derivative

- Use information about f and its first two derivatives to sketch its graph

- Relation between second derivative, concavity and points of inflection

- Equation for a tangent line in terms of the derivative