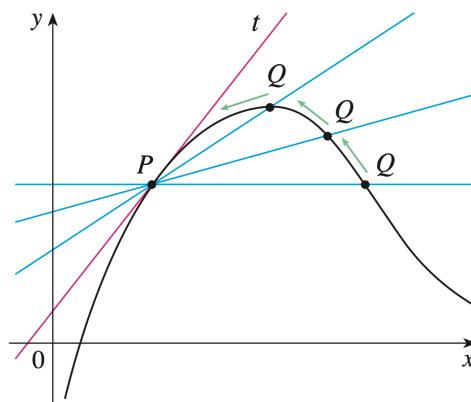
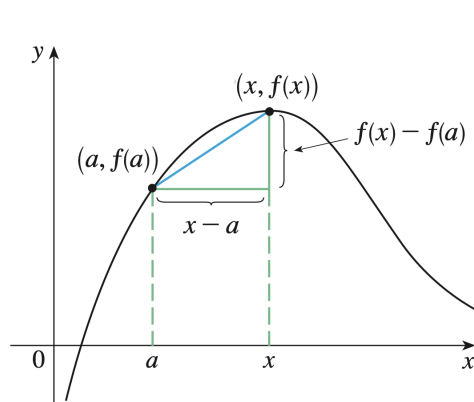


2.7 Derivatives and Rates of Change

Question. What is the story so far?

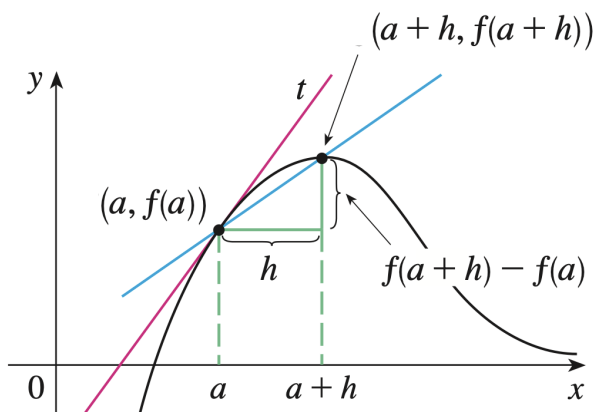
Definition.

- What is the slope of the secant line through $(a, f(a))$ and $(x, f(x))$?
- What is the slope of the tangent line at $(a, f(a))$?



Example. Find an equation of the tangent line to the parabola $y = x^2$ at the point $(1, 1)$.

Definition. What is another way to write the slope of the tangent line through $(a, f(a))$?



Example. Find an equation of the tangent line to the hyperbola $y = \frac{3}{x}$ at the point $(3, 1)$.

Example. Suppose that a ball is dropped from 450 m above the ground.

- What is the velocity of the ball after 5 seconds?
- How fast is the ball traveling when it hits the ground?

Definition. What is the derivative of a function f at a number a ?

Example. Find the derivative of the function $f(x) = x^2 - 8x + 9$ at the number a .

Example. Find an equation of the tangent line to the parabola $f(x) = x^2 - 8x + 9$ at the point $(3, -6)$.