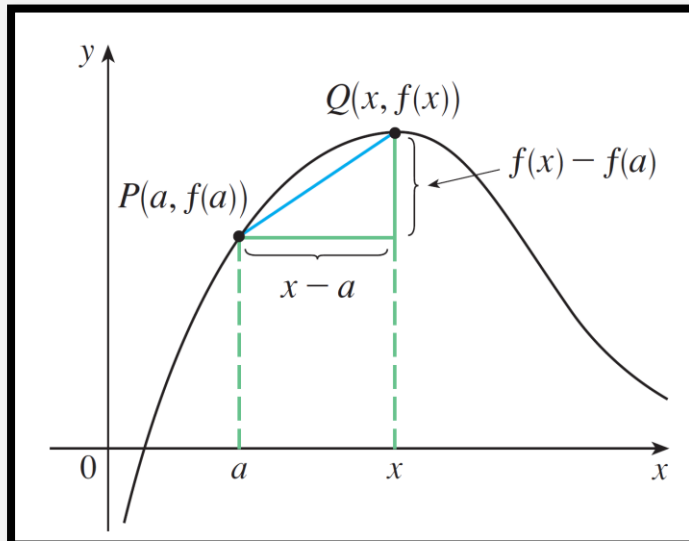
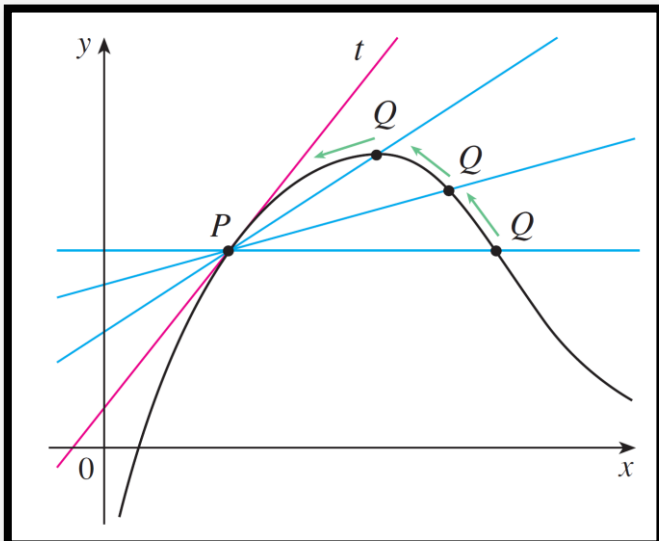


**Definition:**

The **tangent line** to the curve  $y = f(x)$  at the point  $P(a, f(a))$  is the line through  $P$  with slope

$$m = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

provided that this limit exists.

**Derivatives:****Definition:**

The **derivative of a function  $f$**  at a number  $a$ , denoted by  $f'(a)$ , is

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

if this limit exists.

**Definition:**

The **tangent line to  $y = f(x)$**  at  $(a, f(a))$  is the line through  $(a, f(a))$  whose slope is equal to  $f'(a)$ , the derivative of  $f$  at  $a$ .

**Example:**

(1) Find the derivative of the given function at the number  $a$ .

$$f(x) = x^2 - 8x + 9$$

**Solution:**

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

**Solution:**