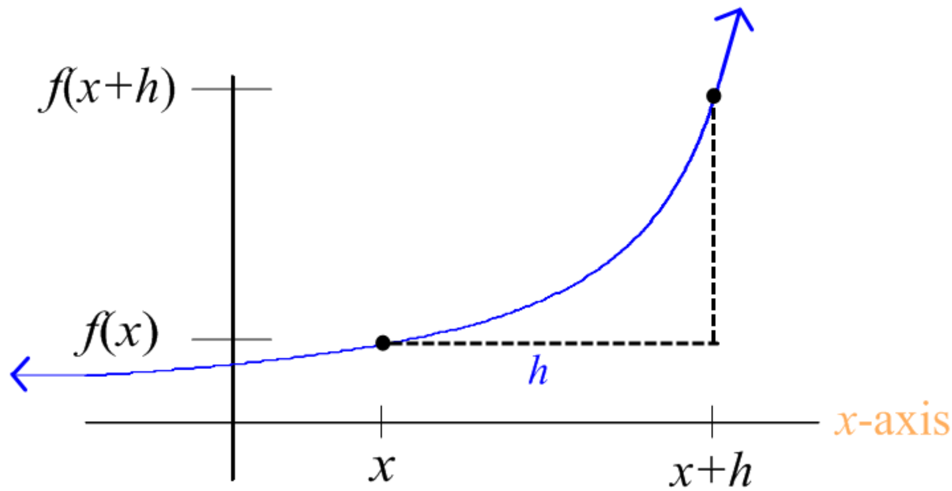
2.1 Day 1 - tangent lines



slope = m = rate of change

For a line, it's constant. For a curve, it's constantly changing.

$$m_{\text{secant}} = \frac{rise}{run} = \frac{difference\ y's}{difference\ x's}$$

Secant lines will give a close approximation on the slope at a point, but we want an exact answer. To do this, the distance h must approach zero. When this happens, the secant line becomes a tangent line.

$$m_{\text{tangent}} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

This is called the derivative of $f(x)$ at $(x, f(x))$ "slope of a function at a point"

Examples:

Find the derivative at each given point.

1. $f(x) = 3x - 2$

   a) $(-1, -5)$

   b) $(3, 7)$

2. $f(x) = x^2 + x - 1$

   a) $(0, -1)$

   b) $(-2, 1)$

Assignment: 1-4 from 2.1 ws and 1, 2 from p. 103

2.1 Day 2 - more derivatives

The derivative of $f(x)$ is $f'(x)$ (we say "f prime")

To review, the formula below finds derivative of *x* at the given point.

$$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$$

value of the function really, really, really, close to *x*

value of the function at *x*

horizontal distance between the two points

Examples:

1. $g(x)=x^3-x^2$

2. $h(x)=\sqrt{x}$

3. $f(x)=\dfrac{1}{x^2}$

Assignment: 5, 6 from 2.1 ws and 15-24 from p. 103 (omit 20 and 22)