Section 2.2
Derivative Formulas
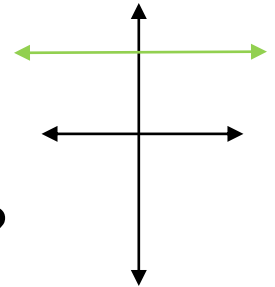
Graph y = 8.

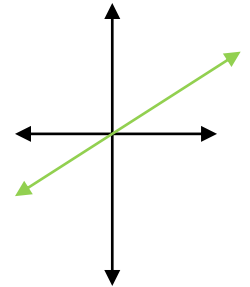What is the slope of any point on y = 8?

Therefore, if f(x) = 8, f '(x) =0.

Derivative of a constant, c, is zero.

$$\frac{d}{dx}(c) = 0$$

Graph y = x.

What is the slope of any point on y = x?

Therefore, if f(x) = x, f '(x) = 1.

Derivative of a variable, x, is one.

$$\frac{d}{dx}(x) = 1$$

Calculate f ' (x) of

$f(x) = x^2$ $f(x) = x^3$ $f(x) = x^4$

Notice a Pattern?

Power Rule:
$$\frac{d}{dx}(x^n) = nx^{n-1}$$

Try: $f(x) = x^5$, $f'(x) =$

- Constant Multiple Rule:

$$\frac{d}{dx}[cf(x)] = c\frac{d}{dx}[f(x)]$$

- Example: f(x) = 3x^6 f'(x) =

- General Rule: $\frac{d}{dx}[cx^n] = c \cdot nx^{n-1}$

Find each derivative

1. $\dfrac{d}{dx}(x^5) =$

2. $\dfrac{d}{dx}(3x^4) =$

3. $\dfrac{d}{dx}(x^{-2}) =$

4. $\dfrac{d}{dx}(x^{3/4}) =$

5. $\dfrac{d}{dx}\left(\dfrac{1}{x}\right) =$

6. $\dfrac{d}{dx}\left(\dfrac{6}{x^3}\right) =$

7. $\dfrac{d}{dx}\left(\dfrac{1}{\sqrt[3]{x^2}}\right) =$

8. $\dfrac{d}{dx}(x^2\sqrt{x}) =$

Sum and Difference Rules:

$$\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$$

- Example:

$$\frac{d}{dx}[x^8 + 12x^5 - 4x^4 + 10x^3 - 6x + 5] =$$