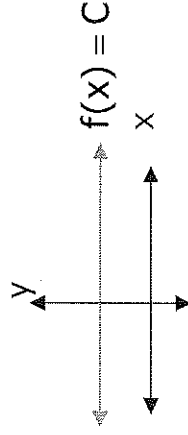


2.3 Differentiation Formulas**Derivative of a Constant Function** ($f(x) = C$)

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



The slope of a constant function is _____,
therefore the derivative is _____.

$$\frac{d}{dx}(C) =$$

Derivative of a Power Function ($f(x) = x^n$)

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

$$\frac{d}{dx}(x^n) =$$

$$\frac{d}{dx}(cx^n) =$$

Ex.) Differentiate

a) $f(x) = x^5$

b) $y = 2x^{1000}$

c) $f(x) = \frac{4}{x^3}$

Sum and Difference Rules

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

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

Ex.) Find $f'(x)$ and $f'(2)$ if $f(x) = 4x^2 - 5x + 6$.

Product Rule ($H(x) = f(x) \cdot g(x)$)

$$H'(x) = \quad \text{or} \quad \frac{d}{dx} [f(x)g(x)] =$$

Ex.) Find the derivative of

a) $f(x) = (3x^2 + 5)(4x^3 + x)$ b) $g(x) = \frac{x^2 - 12x}{5}$

c) $h(x) = \frac{1}{x^3} + \sqrt{x} - \sqrt[3]{x^2}$

Ex.) If $h(x) = \sqrt{x} \cdot g(x)$ where $g(4) = 8$ and $g'(4) = 7$, find $h'(4)$.