

## DIFFERENTIATION RULES:

### CONSTANTS:

$$(1) \frac{d}{dx} [c] = 0$$

$$(2) \frac{d}{dx} [cf(x)] = c f'(x)$$

### SUM AND DIFFERENCE:

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

### POWER RULE:

$$\frac{d}{dx} [x^n] = nx^{n-1}$$

### TRIG FUNCTIONS:

$$(1) \frac{d}{dx} [\sin(x)] = \cos(x)$$

$$(2) \frac{d}{dx} [\cos(x)] = -\sin(x)$$

$$(3) \frac{d}{dx} [\sec(x)] = \sec(x)\tan(x)$$

$$(4) \frac{d}{dx} [\tan(x)] = \sec^2(x)$$

$$(5) \frac{d}{dx} [\csc(x)] = -\csc(x)\cot(x)$$

$$(6) \frac{d}{dx} [\cot(x)] = -\csc^2(x)$$

### EXPONENTIAL FUNCTIONS:

$$(1) \frac{d}{dx} [e^x] = e^x$$

$$(2) \frac{d}{dx} [e^{cx}] = ce^{cx}, \text{ c IS A CONSTANT}$$

$$(3) \frac{d}{dx} [a^x] = a^x \ln(a)$$

$$(4) \frac{d}{dx} \ln(x) = \frac{1}{x}$$

PRODUCT RULE:

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

QUOTIENT RULE:

$$\frac{d}{dx} \left[ \frac{f(x)}{g(x)} \right] = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$