Calculus

Derivative Rules

Constant Rule:

The derivative of a cOnstant is O

Power Rule:

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

Constant * Function Rule:

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

Sum & Difference Rule:

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

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

This times the derivative of that plus that times the derivative of this

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

Ho-d-Hi – Hi-d-Ho over HoHo

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

Do-I-Di

Position: $s(t) = \frac{1}{2}gt^2 + v_0t + s_0$

Velocity: v(t) = s'(t)

Acceleration: a(t) = v'(t) = s''(t)

Trig Derivatives:

$$\frac{d}{dx}[\sin x] = \cos x \qquad \frac{d}{dx}[\cos x] = -\sin x$$

$$\frac{d}{dx}[\tan x] = \sec^2 x \qquad \frac{d}{dx}[\cot x] = -\csc^2 x$$

$$\frac{d}{dx}[\sec x] = \sec x \tan x \qquad \frac{d}{dx}[\csc x] = -\csc x \cot x$$