Math 201
Section 2.3 Introduction to Techniques of Differentiation

Theorem

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

(ie, the derivative of a constant is 0.)

The Power Rule If n is any real number, then

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

The Constant Multiple Rule If c is a constant and f is a differentiable function, then

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

The Sum Rule If f and g are both differentiable, then

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

Higher Order Derivatives The derivative f' is a function itself, so we can take the derivative of f'. The derivative of f' is called the second derivative of f and denoted by

$$f''(x) = \frac{d^2y}{dx^2} = y'' = \cdots$$

In general, we use the notation for the nth derivative of f :

$$f^{(n)}(x) = \frac{d^ny}{dx^n} = y^{(n)} = \cdots$$

If $s(t)$ is a position function, its second derivative is acceleration.