

## Formulae and Theorems

### Rule 1 Derivative of a Constant $c$

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

### Rule 2 The Power Rule

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

### Rule 3 Derivative of a Constant Multiplied by a Function

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

### Rule 4 The Sum and Difference Rules

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

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

### Rule 5 The Product Rule

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

### Rule 6 The Quotient Rule

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

### Rule 7a The Chain Rule

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

### Rule 7b The Chain Rule using the power rule

$$\frac{d}{dx}[f(x)]^n = n[f(x)]^{n-1}f'(x)$$

### Point-slope equation of a line

$$y - y_1 = m(x - x_1)$$