

## CALC 103

### MIDTERM EXAM FORMULA SHEET

#### Limits:

$$\lim_{x \rightarrow a} C = C, \quad \lim_{x \rightarrow \infty} \frac{1}{x} = 0, \quad \lim_{x \rightarrow \infty} x = \infty$$

#### Derivatives:

$$* \frac{d}{dx}(c) = 0 \quad c = \text{constant}$$

$$* \frac{d}{dx}[kx + C] = k \quad k \text{ and } C \text{ are constants}$$

$$* \frac{d}{dx}(cx^n) = cnx^{n-1} \quad \text{Power of } x \text{ Rule}$$

$$* \frac{d}{dx}(cu^n) = cnu^{n-1} \frac{du}{dx} = cnu^{n-1} \cdot u' \quad \text{Power of a Function of } x \text{ Rule}$$

$$* \frac{d}{dx}(u + v) = \frac{du}{dx} + \frac{dv}{dx} = u' + v' \quad \text{Sum Rule}$$

$$* \frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx} \quad \text{Chain Rule}$$

$$* \frac{d}{dx}(uv) = u \frac{dv}{dx} + v \frac{du}{dx} = uv' + vu' \quad \text{Product Rule}$$

$$* \frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2} = \frac{vu' - uv'}{v^2} \quad \text{Quotient Rule}$$

$$* \text{Velocity} \quad v = \frac{ds}{dt} = s' \quad \text{where } s \text{ is a displacement function.}$$

$$* \text{Acceleration} \quad a = \frac{dv}{dt} = \frac{d^2s}{dt^2} = s''$$

#### Differential:

$$dy = f'(x) dx$$