

Survey of Calculus Formula Sheet**Please do not write or make any marks on this formula sheet**

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

$$\frac{d}{dx} \left[\frac{N(x)}{D(x)} \right] = \frac{D(x) \cdot N'(x) - N(x) \cdot D'(x)}{[D(x)]^2}$$

$$\frac{d}{dx}[g(x)]^k = k \cdot [g(x)]^{k-1} \cdot \left[\frac{d}{dx} g(x) \right]$$

$$\frac{d}{dx} e^{f(x)} = e^{f(x)} \cdot f'(x)$$

$$\frac{d}{dt} \ln f(t) = \frac{f'(t)}{f(t)}$$

$$v(t) = s'(t)$$

$$a(t) = v'(t) = s''(t)$$

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

$$\text{Revenue} = \text{unit price} \cdot \text{quantity}$$

$$\text{Cost} = \text{variable cost} \cdot \text{quantity} + \text{fixed costs}$$

$$A = P \left(1 + \frac{r}{m} \right)^{mt}$$

$$A = Pe^{rt}$$

$$P(t) = P_0 e^{kt}$$

$$\text{Elasticity of demand} = E(x) = \frac{-x \cdot D'(x)}{D(x)}$$

$$\text{Area} = \int_a^b [f(x) - g(x)] dx$$

$$\text{Average value} = y_{av} = \frac{1}{b-a} \int_a^b f(x) dx$$

$$\text{Consumers' surplus} = \int_0^Q D(x) dx - QP$$

$$\text{Producers' surplus} = QP - \int_0^Q S(x) dx$$

$$\text{Accumulated Future Value of a Continuous Revenue Stream} = \int_0^T R(t) e^{kt} dt$$

$$\text{Accumulated Present Value of a Continuous Revenue Stream} = \int_0^T R(t) e^{-kt} dt$$

$$D = f_{xx}(a, b) \cdot f_{yy}(a, b) - [f_{xy}(a, b)]^2$$

$$F(x, y, \lambda) = f(x, y) - \lambda \cdot g(x, y)$$

Geometric Formulas

$$\text{Volume of a rectangular solid} = LWH$$

$$\text{Volume of a cylinder} = \pi r^2 L$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Total surface area of a cylinder} = 2\pi rh + 2\pi r^2$$

$$\text{Surface area of a sphere} = 4\pi r^2$$