

FORMULA SHEET

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$\sin^2 \theta = \frac{1}{2}(1 - \cos(2\theta))$$

$$\cos^2 \theta = \frac{1}{2}(1 + \cos(2\theta))$$

$$\frac{d}{dx} \sin x = \cos x$$

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

$$\frac{d}{dx} \tan x = \sec^2 x$$

$$\frac{d}{dx} \csc x = -\csc x \cot x$$

$$\frac{d}{dx} \sec x = \sec x \tan x$$

$$\frac{d}{dx} \cot x = -\csc^2 x$$

$$\frac{d}{dx} \arcsin x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \arccos x = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \arctan x = \frac{1}{1+x^2}$$

$$\frac{d}{dx} \operatorname{arccsc} x = -\frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx} \operatorname{arcsec} x = \frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx} \operatorname{arccot} x = -\frac{1}{1+x^2}$$

$$\frac{d}{dx} \ln x = \frac{1}{x}$$

$$\frac{d}{dx} e^x = e^x$$

$$\int f(u) \cdot \frac{du}{dx} \cdot dx = \int f(u) du$$

$$\int u dv = uv - \int v du$$

$$\int \sec x dx = \ln |\sec x + \tan x| + C$$

$$\int \tan x dx = \ln |\sec x| + C$$

$$M_N = \sum_{j=1}^N f(\bar{x}_j) \Delta x$$

$$|E_M| \leq \frac{K(b-a)^3}{24n^2}, \text{ where } |f''(x)| \leq K.$$

$$T_N = \sum_{j=0}^{N-1} [f(x_{j-1}) + f(x_j)] \frac{\Delta x}{2}$$

$$|E_T| \leq \frac{K(b-a)^3}{12n^2}, \text{ where } |f''(x)| \leq K.$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \text{ for } |x| < 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} \text{ for all } x$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} \text{ for all } x$$

$$\cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \text{ for all } x$$

$$\arctan x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} \text{ for } |x| < 1$$

$$\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n} \text{ for } |x| < 1$$

$$(1+x)^k = \sum_{n=0}^{\infty} \binom{k}{n} x^n \text{ for } |x| < 1$$