Formula Sheet

Course Name - Exam

Calculus

Derivatives:

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

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

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

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

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

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

Rules:

$$(f \pm g)' = f' \pm g'$$

$$(fg)' = f'g + fg'$$

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

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

Integrals:

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \, n \neq -1$$

$$\int e^x dx = e^x + C$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int \sin x dx = -\cos x + C$$

$$\int \cos x dx = \sin x + C$$

$$\int \sec^2 x dx = \tan x + C$$

Fundamental Theorem:

$$\int_a^b f(x)dx = F(b) - F(a)$$

Trigonometry

Pythagorean Identity:

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

Angle Sum Formulas:

$$\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$$

Double Angle Formulas:

$$\sin(2\theta) = 2\sin\theta\cos\theta$$

$$\cos(2\theta) = \cos^2\theta - \sin^2\theta$$

$$= 2\cos^2\theta - 1$$

$$= 1 - 2\sin^2\theta$$

Algebra

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Exponent Rules:

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^n = a^n b^n$$

Logarithm Rules:

$$\log(xy) = \log x + \log y$$

$$\log(x/y) = \log x - \log y$$

$$\log(x^n) = n \log x$$

$$\log_a a = 1$$

Geometry

Area Formulas:

$$\text{Circle:} \quad A = \pi r^2$$

$$\text{Triangle:} \quad A = \frac{1}{2}bh$$

$$\text{Rectangle:} \quad A = lw$$

Volume Formulas:

$$\text{Sphere:} \quad V = \frac{4}{3}\pi r^3$$

$$\text{Cylinder:} \quad V = \pi r^2 h$$

$$\text{Cone:} \quad V = \frac{1}{3}\pi r^2 h$$

Statistics

Mean:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Variance:

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$$

Standard Deviation:

$$s = \sqrt{s^2}$$