Limit Laws

$$\lim_{x\to a} f(x) \pm g(x) = \lim_{x\to a} f(x) \pm \lim_{x\to a} g(x)$$

$$\lim_{x\to a} kf(x) = k\lim_{x\to a}$$

$$\lim_{x\to a} C = C$$

$$\lim_{x\to a}[f(x)g(x)] = \lim_{x\to a} f(x) \lim_{x\to a} g(x)$$

$$\lim_{x\to a}\left[\frac{f(x)}{g(x)}\right] = \frac{\lim_{x\to a} f(x)}{\lim_{x\to a} g(x)}$$

$$\lim_{x\to a}[f(x)]^n = \left[\lim_{x\to a} f(x)\right]^n$$

$$\lim_{x\to \infty}\left(\frac{c}{x^n}\right) = 0$$

$$\lim_{x\to -\infty}\left(\frac{c}{x^n}\right) = 0$$

Derivative Rules

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

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

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

$$\frac{d}{dx} cf(x) = c\frac{d}{dx} f(x)$$

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

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

Common Derivatives

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

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

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

$$\frac{d}{dx}a^x = a^x \ln(a)$$

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

$$\frac{d}{dx}\ln(x) = \frac{1}{x}, x > 0$$

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

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

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

$$\frac{d}{dx}\sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\cos^{-1}(x) = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\tan^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

Integral Rules

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

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

$$\int cf(x)\,dx = c\int f(x)dx$$

$$\int f(x) \pm g(x)\,dx = \int f(x)dx \pm \int g(x)dx$$

Common Integrals

$$\int \sin(x)\,dx = -\cos(x) + C$$

$$\int \csc(x)\,dx = -\ln|\csc(x) + \cot(x)| + C$$

$$\int \cos(x)\,dx = \sin(x) + C$$

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

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

$$\int \cot(x)\,dx = \ln|\sin(x)| + C$$

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

$$\int \ln(x)\,dx = x\ln(x) - x + C$$

$$\int a^x\,dx = \frac{a^x}{\ln(a)} + C$$

Logarithm Properties

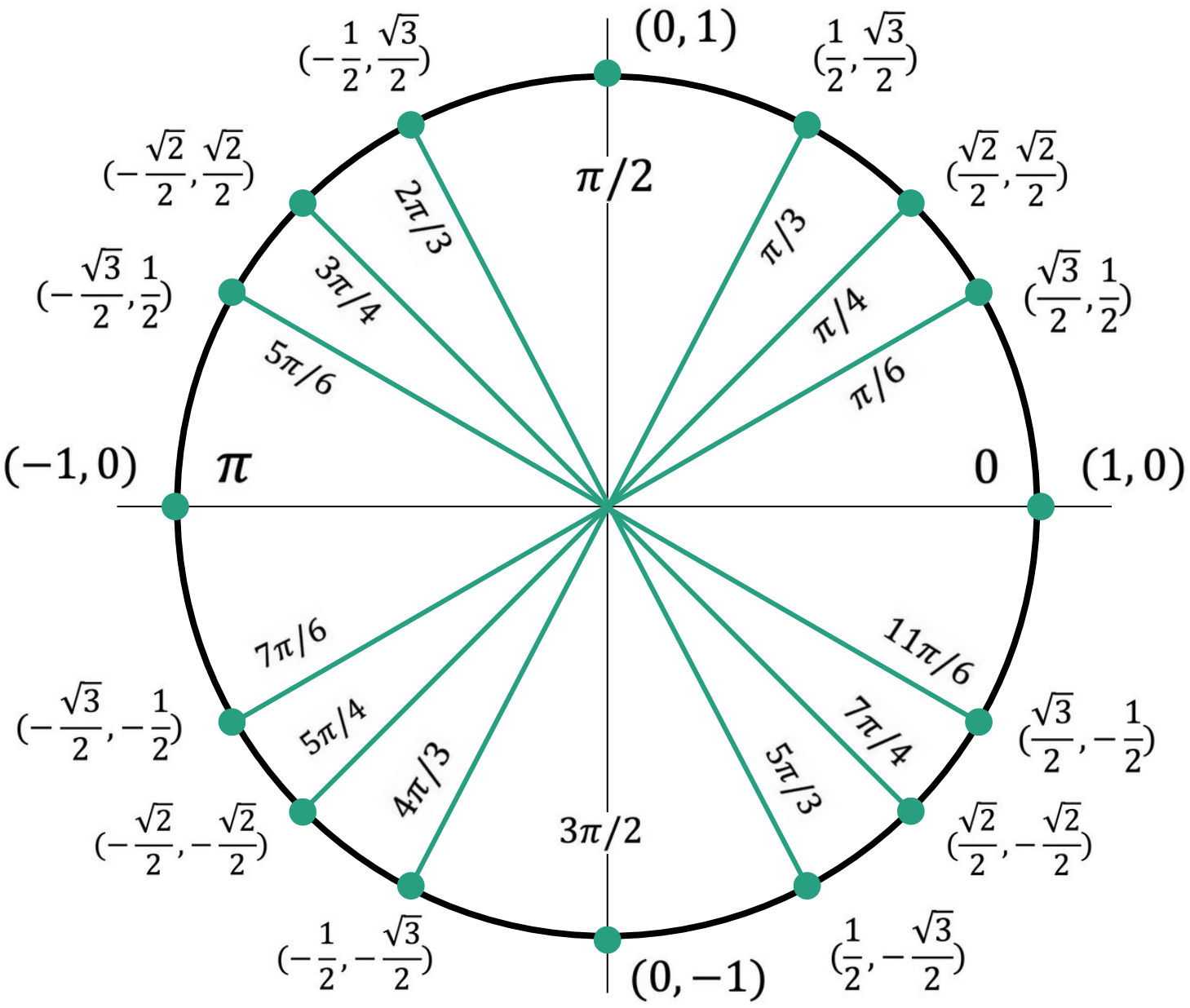
$$\log_a(xy) = \log_a(x) + \log_a(y)$$

$$\log_a\left(\frac{x}{y}\right) = \log_a(x) - \log_a(y)$$

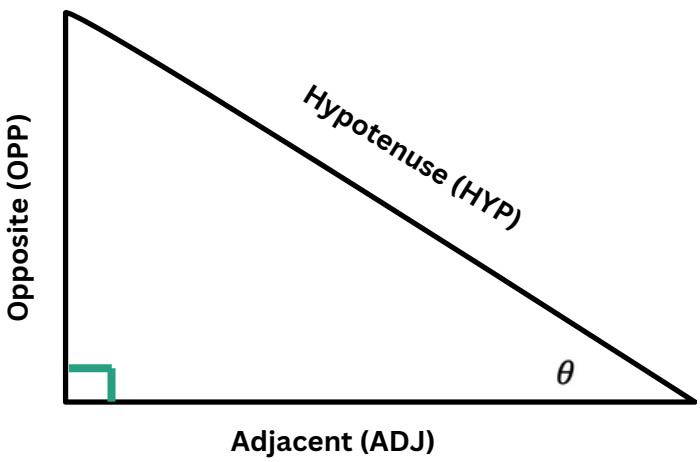
$$\log_a(x^r) = r\log_a(x)$$

Unit Circle

(cos, sin)



Trigonometry



$$\sin(\theta) = \frac{OPP}{HYP} \qquad \csc(\theta) = \frac{1}{\sin(\theta)} = \frac{HYP}{OPP}$$

$$\cos(\theta) = \frac{ADJ}{HYP} \qquad \sec(\theta) = \frac{1}{\cos(\theta)} = \frac{HYP}{ADJ}$$

$$\tan(\theta) = \frac{OPP}{ADJ} \qquad \cot(\theta) = \frac{1}{\tan(\theta)} = \frac{ADJ}{OPP}$$