

Differentiation Formulas:

$$1. \frac{d}{dx}(x) = 1$$

$$2. \frac{d}{dx}(ax) = a$$

$$3. \frac{d}{dx}(x^n) = nx^{n-1}$$

$$4. \frac{d}{dx}(\cos x) = -\sin x$$

$$5. \frac{d}{dx}(\sin x) = \cos x$$

$$6. \frac{d}{dx}(\tan x) = \sec^2 x$$

$$7. \frac{d}{dx}(\cot x) = -\csc^2 x$$

$$8. \frac{d}{dx}(\sec x) = \sec x \tan x$$

$$9. \frac{d}{dx}(\csc x) = -\csc x(\cot x)$$

$$10. \frac{d}{dx}(\ln x) = \frac{1}{x}$$

$$11. \frac{d}{dx}(e^x) = e^x$$

$$12. \frac{d}{dx}(a^x) = (\ln a)a^x$$

$$13. \frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

$$14. \frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$$

$$15. \frac{d}{dx}(\sec^{-1} x) = \frac{1}{|x|\sqrt{x^2-1}}$$

Integration Formulas:

$$1. \int 1 dx = x + C$$

$$2. \int a dx = ax + C$$

$$3. \int x^n dx = \frac{x^{n+1}}{n+1} + C, n \neq -1$$

$$4. \int \sin x dx = -\cos x + C$$

$$5. \int \cos x dx = \sin x + C$$

$$6. \int \sec^2 x dx = \tan x + C$$

$$7. \int \csc^2 x dx = -\cot x + C$$

$$8. \int \sec x(\tan x) dx = \sec x + C$$

$$9. \int \csc x(\cot x) dx = -\csc x + C$$

$$10. \int \frac{1}{x} dx = \ln |x| + C$$

$$11. \int e^x dx = e^x + C$$

$$12. \int a^x dx = \frac{a^x}{\ln a} + C, a > 0, a \neq 1$$

$$13. \int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + C$$

$$14. \int \frac{1}{1+x^2} dx = \tan^{-1} x + C$$

$$15. \int \frac{1}{|x|\sqrt{x^2-1}} dx = \sec^{-1} x + C$$