

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