Taylor's Formula

$$f(x) = f(a) + f'(a)(x-a) + \frac{f''(a)}{2}(x-a)^2 + \frac{f'''(a)}{3!}(x-a)^3 + \cdots + \frac{f^{(n)}(a)}{n!}(x-a)^n + \frac{f^{(n+1)}(z)}{(n+1)!}(x-a)^{n+1}$$

Maclaurin Series

1. $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, \quad -\infty < x < \infty$
2. $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots, \quad -\infty < x < \infty$
3. $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots, \quad -\infty < x < \infty$
4. $\frac{1}{1-x} = 1 + x + x^2 + x^3 + \cdots, \quad -1 < x < 1$
5. $\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots, \quad -1 < x < 1$
6. $\arctan(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \cdots, \quad -1 < x < 1$

Summation Formulae

7. $\sum_{i=1}^{n} c = cn$
8. $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$
9. $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$
10. $\sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$

Inverse Trigonometric Functions

11. $\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$
12. $\frac{d}{dx}(\arccos x) = \frac{-1}{\sqrt{1-x^2}}$
13. $\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$
14. $\frac{d}{dx}(\operatorname{arcsec} x) = \frac{1}{x\sqrt{x^2-1}}$
15. $\frac{d}{dx}(\operatorname{arccsc} x) = \frac{-1}{x\sqrt{x^2-1}}$
16. $\frac{d}{dx}(\operatorname{arccot} x) = \frac{-1}{1+x^2}$
17. $\int \frac{dx}{\sqrt{a^2-x^2}} = \arcsin\left(\frac{x}{a}\right) + C$
18. $\int \frac{dx}{a^2+x^2} = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + C$
19. $\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{a}\operatorname{arcsec}\left(\frac{x}{a}\right) + C$

Trigonometric Identities

20. $\sin^2 x + \cos^2 x = 1$
21. $1 + \tan^2 x = \sec^2 x$
22. $\sin^2 x = \frac{1-\cos(2x)}{2}$
23. $\cos^2 x = \frac{1+\cos(2x)}{2}$
24. $\sin(x+y) = \sin x \cos y + \cos x \sin y$
25. $\cos(x+y) = \cos x \cos y - \sin x \sin y$