Important Maclaurin Series

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots \qquad R = 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots \qquad R = \infty$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \qquad R = \infty$$

$$\cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots \qquad R = \infty$$

$$\tan^{-1} x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \cdots \qquad R = 1$$

$$\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n} = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots \qquad R = 1$$

$$(1+x)^k = \sum_{n=0}^{\infty} \binom{k}{n} x^n = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 \cdots \qquad R = 1$$

Important Angles

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
0	0	1	0
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
$\frac{\pi}{2}$	1	0	∞

Fundamental Identities

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

$$\sec^2\theta - \tan^2\theta = 1$$

$$\csc^2\theta - \cot^2\theta = 1$$

Half-Angle Formulae

$$\cos^2 x = \frac{1 + \cos 2\theta}{2}$$

$$\sin^2 x = \frac{1 - \cos 2\theta}{2}$$

Double-Angle Formulae

$$\cos 2x = \cos^2 x - \sin^2 x$$

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

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

$$\sin 2x = 2\sin x \cos x$$

$$\tan 2x = \frac{2\tan x}{1 - \tan x}$$

$\frac{\mathrm{d}}{\mathrm{d}u}f(u)$	$f(u)$	$\int f(u)\,\mathrm{d}u$	
e^u	e^u	e^u	
e^u	a^u	$\frac{a^u}{\ln a}$	
$-u^{-2}$	$\frac{1}{u}$	$\ln\lvert u\rvert$	
$\frac{1}{u}$	$\ln u$	$u\ln\lvert u\rvert - u$	100
$\cos u$	$\sin u$	$-\cos u$	
$-\sin u$	$\cos u$	$\sin u$	
$\sec^2 u$	$\tan u$	$\ln\lvert\sec u\rvert$	12
$\sec u\tan u$	$\sec u$	$\ln\lvert\sec u+\tan u\rvert$	14
$-\csc u\cot u$	$\csc u$	$\ln\lvert\csc u-\cot u\rvert$	15
$-\csc^2 u$	$\cot u$	$\ln\lvert\sin u\rvert$	13
$2\sin u\cos u$	$\sin^2 u$	$\frac{1}{2}u-\frac{1}{4}\sin 2u$	63
$-2\sin u\cos u$	$\cos^2 u$	$\frac{1}{2}u+\frac{1}{4}\sin 2u$	64
$2\tan u\sec^2 u$	$\tan^2 u$	$\tan u-u$	65
$2\tan u\sec^2 u$	$\sec^2 u$	$\tan u$	
$-2\cot u\csc^2 u$	$\csc^2 u$	$-\cot u$	
$-2\cot u\csc^2 u$	$\cot^2 u$	$-\cot u-u$	66

12: $\tan u$

13: $\cot u$

14: $\sec u$

15: $\csc u$

16: $\frac{1}{\sqrt{a^2-u^2}}$

17: $\frac{1}{a^2+u^2}$

18: $\frac{1}{u\sqrt{u^2-a^2}}$

19: $\frac{1}{a^2-u^2}$

20: $\frac{1}{u^2-a^2}$

21: $\sqrt{a^2+u^2}$

63: $\sin^2 u$

64: $\cos^2 u$

65: $\tan^2 u$

66: $\cot^2 u$

67: $\sin^3 u$

68: $\cos^3 u$

69: $\tan^3 u$

70: $\cot^3 u$

71: $\sec^3 u$

72: $\csc^3 u$

73: $\sin^n u$

74: $\cos^n u$

75: $\tan^n u$

76: $\cot^n u$

77: $\sec^n u$

78: $\csc^n u$

82: $u\sin u$

83: $u\cos u$

92: $u\arctan u$

96: ue^{au}

97: $u^n e^{au}$

100: $\ln u$

102: $\frac{1}{u\ln u}$