# Integration Formulas

**B1.** $\displaystyle\int \mathbf{u^n\,du} = \frac{\mathbf{u^{n+1}}}{\mathbf{n+1}} + \mathbf{C}$ **if** $n$ **is a real constant &** $n \neq -1$

**B2.** $\displaystyle\int \frac{\mathbf{du}}{\mathbf{u}} = \mathbf{\ln|u| + C}$

**B3.** $\displaystyle\int \mathbf{e^u\,du} = \mathbf{e^u + C}$

**B4.** $\displaystyle\int \cos\mathbf{u}\,\mathbf{du} = \sin\mathbf{u} + \mathbf{C}$

**B5.** $\displaystyle\int \sin\mathbf{u}\,\mathbf{du} = -\cos\mathbf{u} + \mathbf{C}$

**B6.** $\displaystyle\int \sec^{\mathbf{2}}\mathbf{u}\,\mathbf{du} = \tan\mathbf{u} + \mathbf{C}$

**B7.** $\displaystyle\int \csc^{\mathbf{2}}\mathbf{u}\,\mathbf{du} = -\cot\mathbf{u} + \mathbf{C}$

**B8.** $\displaystyle\int \sec\mathbf{u}\tan\mathbf{u}\,\mathbf{du} = \sec\mathbf{u} + \mathbf{C}$

**B9.** $\displaystyle\int \csc\mathbf{u}\cot\mathbf{u}\,\mathbf{du} = -\csc\mathbf{u} + \mathbf{C}$

**B10.** $\displaystyle\int \tan\mathbf{u}\,\mathbf{du} = \mathbf{-\ln|\cos u| + C = \ln|\sec u| + C}$

**B11.** $\displaystyle\int \cot\mathbf{u}\,\mathbf{du} = \mathbf{\ln|\sin u| + C}$

**B12.** $\displaystyle\int \sec\mathbf{u}\,\mathbf{du} = \mathbf{\ln|\sec u + \tan u| + C}$

**B13.** $\displaystyle\int \csc\mathbf{u}\,\mathbf{du} = \mathbf{-\ln|\csc u + \cot u| + C = \ln|\csc u - \cot u| + C}$

**B14.** $\displaystyle\int \frac{\mathbf{du}}{\sqrt{\mathbf{a^2 - u^2}}} = \mathbf{Arcsin}\ \frac{\mathbf{u}}{\mathbf{a}} + \mathbf{C}$

**B15.** $\displaystyle\int \frac{\mathbf{du}}{\mathbf{a^2 + u^2}} = \frac{\mathbf{1}}{\mathbf{a}}\ \mathbf{Arctan}\ \frac{\mathbf{u}}{\mathbf{a}} + \mathbf{C}$

**B16.** $\displaystyle\int \frac{\mathbf{du}}{\mathbf{u}\sqrt{\mathbf{u^2}-\mathbf{a^2}}} = \frac{\mathbf{1}}{\mathbf{a}}\ \mathbf{Arcsec}\ \frac{\mathbf{u}}{\mathbf{a}} + \mathbf{C}$

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## Trigonometric Identities

T1. $\cos(-\mathbf{x}) = \cos\mathbf{x}$ (even) $\qquad \sin(-\mathbf{x}) = -\sin\mathbf{x}$ (odd)

T2. $\tan\mathbf{x} = \dfrac{\sin\mathbf{x}}{\cos\mathbf{x}} \qquad \cot\mathbf{x} = \dfrac{\cos\mathbf{x}}{\sin\mathbf{x}} \qquad \cot\mathbf{x} = \dfrac{\mathbf{1}}{\tan\mathbf{x}}$

T3. $\sec\mathbf{x} = \dfrac{\mathbf{1}}{\cos\mathbf{x}} \qquad \csc\mathbf{x} = \dfrac{\mathbf{1}}{\sin\mathbf{x}}$

T4. $\cos^{\mathbf{2}}\mathbf{x} + \sin^{\mathbf{2}}\mathbf{x} = \mathbf{1} \qquad 1 + \tan^2 x = \sec^2 x \qquad \mathbf{1} + \cot^{\mathbf{2}}\mathbf{x} = \csc^{\mathbf{2}}\mathbf{x}$

T5. $\cos(\mathbf{x}+\mathbf{y}) = \cos\mathbf{x}\cos\mathbf{y} - \sin\mathbf{x}\sin\mathbf{y} \qquad \sin(\mathbf{x}+\mathbf{y}) = \sin\mathbf{x}\cos\mathbf{y} + \cos\mathbf{x}\sin\mathbf{y}$

T6. $\sin\mathbf{2x} = \mathbf{2}\sin\mathbf{x}\cos\mathbf{x} \qquad \cos\mathbf{2x} = \cos^{\mathbf{2}}\mathbf{x} - \sin^{\mathbf{2}}\mathbf{x} = \mathbf{1} - \mathbf{2}\sin^{\mathbf{2}}\mathbf{x} = \mathbf{2}\cos^{\mathbf{2}}\mathbf{x} - \mathbf{1}$

T7. $\cos^{\mathbf{2}}\mathbf{x} = \dfrac{\mathbf{1}+\cos\mathbf{2x}}{\mathbf{2}} \qquad \sin^{\mathbf{2}}\mathbf{x} = \dfrac{\mathbf{1}-\cos\mathbf{2x}}{\mathbf{2}}$

T8. $\mathbf{f}(\mathbf{x}) = \mathbf{f_C}\left(\dfrac{\pi}{\mathbf{2}} - \mathbf{x}\right)$

$\mathbf{f}\left(\dfrac{\pi}{\mathbf{2}} - \theta\right) = \mathbf{f_C}(\theta)$ where $f$ is any one of the six basic trig functions and $f_C$ is the co-function of $f$.