Table 1: **Basic Integration Formulas**

$f(u)$	$\int f(u)\,du$
$k \quad (k, \text{ a constant})$	$ku + C$
$u^n \qquad (n \neq -1)$	$\frac{u^{n+1}}{n+1} + C$
$u^{-1} = \frac{1}{u}$	$\ln\|u\| + C = \begin{cases} \ln u + C, & \text{if } u > 0 \\ \ln(-u) + C, & \text{if } u < 0 \end{cases}$
e^u	$e^u + C$
b^u	$\frac{b^u}{\ln b}$
$\cos u$	$\sin u + C$
$\sin u$	$-\cos u + C$
$\sec^2 u$	$\tan u + C$
$\csc^2 u$	$-\cot u + C$
$\sec u$	$\ln\|\sec u + \tan u\| + C$
$\csc u$	$-\ln\|\csc u + \cot u\| + C$
$\sec u \tan u$	$\sec u + C$
$\csc u \cot u$	$-\csc u + C$

$\boldsymbol{f(u)}$	$\displaystyle\int \boldsymbol{f(u)\,du}$
$\dfrac{1}{1+u^2}$	$\tan^{-1} u + C$
$\dfrac{1}{\sqrt{1-u^2}}$	$\sin^{-1} u + C$
$\dfrac{1}{u\sqrt{u^2-1}}$	$\sec^{-1} u + C$

The very last integration formula in the table is not used by everyone. And that is because there is no universally accepted definition of the *inverse secant function*. This formula is the correct one if the inverse secant function is defined by

$$y = \sec^{-1} u \ (|u| \geq 1) \quad \text{if and only if} \quad \sec y = u \text{ and } y \in [0, \tfrac{\pi}{2}) \cup [\pi, \tfrac{3\pi}{2}).$$

However, some authors prefer the range $y \in [0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$. In that case, the corresponding integration formula is

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