Indefinite Integrals You Should Know

Throughout this table, a and b are given constants, independent of x and C is an arbitrary constant.

$f(x)$	$F(x) = \int f(x)\ dx$
$af(x) + bg(x)$	$a\int f(x)\ dx + b\int g(x)\ dx\ +\ C$
$f(x) + g(x)$	$\int f(x)\ dx + \int g(x)\ dx\ +\ C$
$f(x) - g(x)$	$\int f(x)\ dx - \int g(x)\ dx\ +\ C$
$af(x)$	$a\int f(x)\ dx\ +\ C$
$u(x)v'(x)$	$u(x)v(x) - \int u'(x)v(x)\ dx\ +\ C$
$f\big(y(x)\big)y'(x)$	$F\big(y(x)\big)$ where $F(y) = \int f(y)\ dy$
1	$x + C$
x^a	$\frac{x^{a+1}}{a+1} + C$ if $a \neq -1$
$\frac{1}{x}$	$\ln\|x\| + C$
$\sin x$	$-\cos x + C$
$\cos x$	$\sin x + C$
$\csc x$	$\ln\|\csc x - \cot x\| + C$
$\sec x$	$\ln\|\sec x + \tan x\| + C$
$\sec^2 x$	$\tan x + C$
$\csc^2 x$	$-\cot x + C$
e^x	$e^x + C$
$\frac{1}{\sqrt{1-x^2}}$	$\arcsin x + C$
$\frac{1}{1+x^2}$	$\arctan x + C$

Indefinite Integrals You Should Be Able To Derive Quickly

$f(x)$	$F(x) = \int f(x)\ dx$	Derivation method
$\tan x$	$\ln\|\sec x\| + C$	substitute $y(x) = \cos x$
$\cot x$	$\ln\|\sin x\| + C$	substitute $y(x) = \sin x$
$\sec x \tan x$	$\sec x + C$	substitute $y(x) = \cos x$
$\csc x \cot x$	$-\csc x + C$	substitute $y(x) = \sin x$
e^{ax}	$\frac{1}{a}e^{ax} + C$	substitute $y(x) = ax$
a^x	$\frac{1}{\ln a}a^x + C$	write $a^x = e^{x \ln a}$ then sub $y(x) = x \ln a$
$\ln x$	$x \ln x - x + C$	integrate by parts with $u(x) = \ln x,\ v(x) = x$
$\frac{1}{\sqrt{a^2-x^2}}$	$\arcsin \frac{x}{a} + C$	substitute $y(x) = \frac{x}{a}$
$\frac{1}{a^2+x^2}$	$\frac{1}{a} \arctan \frac{x}{a} + C$	substitute $y(x) = \frac{x}{a}$