Immediate Integrals	Generalized Immediate Integrals
$\int x^n dx = \frac{x^{n+1}}{n+1} + c \quad (n \neq -1)$	$\int f(x)^n \cdot f'(x) dx = \frac{f(x)^{n+1}}{n+1} + c$
$\int \frac{1}{x} dx = \ln\|x\| + c$	$\int \frac{f'(x)}{f(x)} dx = \ln\|f(x)\| + c$
$\int a^x dx = \frac{a^x}{\ln a} + c$	$\int f'(x) \cdot a^{f(x)} dx = \frac{a^{f(x)}}{\ln a} + c$
$\int e^x dx = e^x + c$	$\int f'(x) \cdot e^{f(x)} dx = e^{f(x)} + c$
$\int \sin x dx = -\cos x + c$	$\int \sin(f(x)) \cdot f'(x) dx = -\cos(f(x)) + c$
$\int \cos x dx = \sin x + c$	$\int \cos(f(x)) \cdot f'(x) dx = \sin(f(x)) + c$
$\int \frac{1}{\cos^2 x} dx = \tan x + c$	$\int \frac{f'(x)}{\cos^2(f(x))} dx = \tan f(x) + c$
$\int \frac{1}{\sin^2 x} dx = -\cot x + c$	$\int \frac{f'(x)}{\sin^2(f(x))} dx = -\cot f(x) + c$
$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + c$	$\int \frac{f'(x)}{\sqrt{1-f(x)^2}} dx = \arcsin f(x) + c$
$\int \frac{1}{\sqrt{a^2-x^2}} dx = \arcsin\left(\frac{x}{\|a\|}\right) + c$	$\int \frac{f'(x)}{\sqrt{a^2-f(x)^2}} dx = \arcsin\left(\frac{f(x)}{\|a\|}\right) + c$
$\int \frac{1}{1+x^2} dx = \arctan x + c$	$\int \frac{f'(x)}{1+f(x)^2} dx = \arctan f(x) + c$

In General

$$\int f(g(x)) \cdot g'(x) dx = F(g(x)) + c$$

Integration Rules

$$\int k \cdot f(x) dx = k \cdot \int f(x) dx$$

$$\int [f(x) \pm g(x)]\, dx = \int f(x) dx \pm \int g(x) dx$$

$$\int f'(x) \cdot g(x) dx = f(x) \cdot g(x) - \int f(x) \cdot g'(x) dx$$

Other Methods of Integration

- Substitution method
- Rational function integration (partial fractions)
- Integration by series