

How do I integrate that!?

Is the function of a standard form?

YES

Use standard integral functions and adjust for constants

NO

e.g. $5e^{7x+2}$, $\sin(3x-1)$, or $(4x+3)^{1/2}$

Is it made up from two (parametric) equations?

$y = f(t)$, $x = g(t)$, e.g. $\int_0^9 y \, dx$, $x = t^2$, $y = 2t(3-t)$

YES

use $\int y \, dx = \int y \frac{dx}{dt} dt$ and change the limits

NO

Is it in the form?

$\frac{f'(x)}{f(x)}$ or $f'(x)[f(x)]^n$

YES

$$\int \frac{f'(x)}{f(x)} dx = \ln|f(x)| + c$$

$$\int f'(x)[f(x)]^n dx = \frac{[f(x)]^{n+1}}{n+1} + c \quad (n \neq -1)$$

NO

Is it in the form $\frac{ax+b}{(x+c)(x+d)}$ or other fraction?

YES

Use partial fractions to simplify the integral

NO

Is the integral a product of 2 functions?

YES

$$\int f(x)g(x) \, dx$$

$$\frac{dy}{dx}$$

Use the Separation of variables technique

$$\frac{dy}{dx} = f(x)g(y) \Rightarrow \int \frac{1}{g(y)} dy$$

Use integration by parts to simplify the integral

$$\int u \frac{dv}{dx} dx$$

NO

Can you use a trig identity to create something more familiar?

YES

Then use one!

NO

Use a substitution to make things easier (remember to find dx and replace so the integral is in respect to u)