$$\int_1^n u\,dv = u\cdot v\Big|_1^n - \int_1^n v\,du$$

easy formula I use.

I	D
v	u
dv	du

multiply

example: let $f(x) = \frac{\log_2 x}{x}$

let $u = \log_2 n$

$dv = \frac{1}{x}dx$

∴

I	D
$\ln x$	$\frac{1}{\ln 2}(\ln x)$
$\frac{1}{x}dx$	$\frac{1}{\ln 2}\left(\frac{1}{x}\right)$

$$\int_1^n \frac{\log_2 x}{x}dx = \frac{(\ln x)^2}{\ln 2}\Big|_1^n - \int_1^n \frac{\ln x}{\ln 2}\frac{1}{x}dx$$

$$\underbrace{\int_1^n \frac{\log_2 x^2}{x}dx}_{A} = \frac{(\ln x)^2}{\ln 2}\Big|_1^n - \underbrace{\int_1^n \frac{\log_2 x}{x}dx}_{A}$$

$$A = \frac{(\ln x)^2}{\ln 2}\Big|_1^n - A$$

$$2A = \frac{(\ln x)^2}{\ln 2}\Big|_1^n$$

$$\int_1^n \frac{\log_2 x}{x}dx = \frac{(\ln x)^2}{2\ln 2}\Big|_1^n = \frac{(\ln n)^2}{2\ln 2} - 0$$

$$\boxed{= \frac{(\ln n)^2}{2\ln 2}}$$