$$\int \tan x \, dx$$

Solution

$$\int \tan x \, dx = \int \frac{\sin x}{\cos x} \, dx$$

Let $u = \cos x$, so $du = -\sin x \, dx$. So the integral above is equal to

$$-\int \frac{1}{u} \, du = -\ln |u| + C = -\ln |\cos x| + C.$$