

Objective: Integrate trigonometric functions.

Find the indefinite integral of $\int \frac{\csc^2 x}{\cot x} dx$.

ANSWER:

$$\int \frac{\csc^2 x}{\cot x} dx$$

Let $u = \cot x$

$$\frac{du}{dx} = -\csc^2 x$$

$$du = -\csc^2 x dx$$

$$-du = \csc^2 x dx$$

$$\begin{aligned} \text{So, } \int \frac{\csc^2 x}{\cot x} dx &= \int -\frac{1}{u} du \\ &= -\int \frac{1}{u} du \\ &= -[\ln|u|] + C \\ &= -[\ln|\cot x|] + C \end{aligned}$$