$$\int x \cdot \operatorname{cossec}^2 x \, dx =$$

L
I
A
T
E

$$U = x \quad \longrightarrow \quad dv = 1 \, dx$$

$$dv = \boxed{\operatorname{cossec}^2 x} \qquad V = \boxed{- \cot g \, x}$$

$$\int x \cdot \operatorname{cossec}^2 x \, dx = x \cdot \left(-\cot g (x)\right) - \int -\cot g \, x \cdot dx$$

$$\int x \cdot \operatorname{cossec}^2 x \, dx = x \cdot \left(-\cot g (x)\right) + \underline{\int \cot g \, x \, dx} \longrightarrow \ln |\operatorname{sen} x|$$

$$\int x \cdot \operatorname{cossec}^2 x \, dx = x \cdot \left(-\cot g (x)\right) + \ln |\operatorname{sen} x|$$

$$\left. -\cot g(x) \cdot x + \ln |\operatorname{sen} x| \right]_{\frac{\Pi}{4}}^{\frac{\Pi}{2}}$$

$$\left(-\cot g\left(\frac{\Pi}{2}\right) \cdot \frac{\Pi}{2} + \ln |\operatorname{sen} \frac{\Pi}{2}|\right) - \left(-\cot g\left(\frac{\Pi}{4}\right) \cdot \frac{\Pi}{4} + \ln |\operatorname{sen} \frac{\Pi}{4}|\right) =$$

$$0 \quad - \left(-\frac{\Pi}{4} - \frac{1}{2} \ln (2)\right)$$

$$\boxed{\frac{\Pi}{4} + \ln(2) \cdot \frac{1}{2}}$$