Question

$$\int \sec^{2/3}(x) \csc^{4/3}(x) \, dx$$

Solution

$$\int \sec^{2/3}(x) \csc^{4/3}(x) \, dx$$

Substitution

$$u = \tan(x), du = \frac{1}{\cos^2(x)} dx$$

$$\sec^{2/3}(x) \csc^{4/3}(x) = \frac{1}{\cos^2(x)} (\cos^2(x)) \left(\frac{1}{\cos^{2/3}(x)}\right) \left(\frac{1}{\sin^{4/3}(x)}\right) =$$

$$= \frac{1}{\cos^2(x)} \left(\frac{\cos^{4/3}(x)}{\sin^{4/3}(x)}\right) = \frac{1}{\cos^2(x)} \left(\frac{1}{\tan^{4/3}(x)}\right)$$

$$\int \sec^{2/3}(x) \csc^{4/3}(x) \, dx = \int u^{-4/3} \, du = -3u^{-1/3} + C = -\frac{3}{\sqrt[3]{\tan(x)}} + C$$

Answer:

$$\int \sec^{2/3}(x) \csc^{4/3}(x) \, dx = -\frac{3}{\sqrt[3]{\tan(x)}} + C$$