

**EXAMPLE 4** Indefinite integrals involving trigonometric functions Determine the following indefinite integrals.

a.  $\int \left( \frac{2}{\pi} \sin x - 2 \csc^2 x \right) dx$

b.  $\int \frac{4 \cos x + \sin^2 x}{\sin^2 x} dx$

a.

$$= \frac{2}{\pi} \int \sin x \cdot dx - 2 \int \csc^2 x \cdot dx$$

$$= \frac{2}{\pi} \cdot (-\cos x) + 2 \cdot (+\cot x) + C$$

$$= \frac{-2}{\pi} \cdot \cos x + 2 \cot x + C$$

b.

$$\int \frac{4 \cos x + \sin^2 x}{\sin^2 x} \cdot dx = \int \frac{4 \cdot \cos x}{\sin^2 x} \cdot dx + \int \frac{\sin^2 x}{\sin^2 x} \cdot dx$$

$$= 4 \int \frac{\cos x}{\sin x} \cdot \frac{1}{\sin x} \cdot dx + \int \underline{1} \cdot dx$$

$$= 4 \int \cot x \cdot \csc x \cdot dx + \int 1 \cdot dx$$

$$= 4 \cdot (-\csc x) + x + C$$