

3. Evaluate the following integrals.

$$\text{a. } \int \frac{dx}{\tan x + \cot x} = \int \frac{1}{\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}} dx = \int \frac{\sin x \cos x}{\sin^2 x + \cos^2 x} dx$$

$$= \frac{1}{2} \int \sin 2x dx = -\frac{1}{4} \cos 2x + C$$

$$\text{b. } \int_{1/3}^1 x^{-4} (x^{-7} + 7x^{-3})^{1/3} dx = \int_{1/3}^1 (x^{-4} + 7)^{1/3} \cdot x^{-5} dx$$

$$= \int_{88}^8 u^{1/3} \cdot \left(-\frac{1}{4} du\right) = -\frac{1}{4} \cdot \frac{u^{4/3}}{4/3} \Big|_{88}^8 = -\frac{3}{16} \cdot (8^{4/3} - 88^{4/3})$$

$$= 3 \cdot (11^{4/3} - 1)$$

$$u = x^{-4} + 7$$

$$du = -4x^{-5} dx$$