

$$\int \frac{e^{4x}}{e^{4x}} + \frac{1}{e^{4x}} dx = \int 1 + \frac{1}{e^{4x}} dx \quad \text{Rewrite because } \frac{e^{4x}}{e^{4x}} = 1$$

$$\int \frac{e^{4x}}{e^{4x}} + \frac{1}{e^{4x}} dx = \int 1 + e^{-4x} dx \quad \text{Rewrite using the definition of neg. expos.}$$

$$\int \frac{e^{4x}}{e^{4x}} + \frac{1}{e^{4x}} dx = \int 1 dx + \int e^{-4x} dx \quad \text{Split up the integral}$$

$$\int \frac{e^{4x}}{e^{4x}} + \frac{1}{e^{4x}} dx = x + \int e^{-4x} dx \quad \text{The antiderivative of 1 is x and the other one you can do with u-sub.}$$

Let  $u = -4x$

$$du = -4 dx \quad \text{so } \frac{du}{-4} = dx \quad \text{Replace to get } \int e^u \cdot \frac{1}{-4} du = \frac{-1}{4} \cdot \int e^u du = \frac{-1}{4} e^u \quad \text{now replace u with } -4x \text{ again } \frac{-1}{4} e^{-4x}$$

$$\text{Now you can write } x + \frac{-1}{4} \cdot e^{-4x} + C$$