

00 - Warming Up

We will first start by warming up. In solving the following integrals, you will need to remember techniques taught in a standard Calculus II course: integration by substitution, integration by parts, trigonometric integration, and partial fraction decomposition. Don't let the extra parameters scare you: remember that they are just constant with respect to the variable of integration (unless you are explicitly told otherwise). We are assuming that these parameters are positive (unless otherwise stated).

Example 1

Evaluate the following integral.

$$\int_1^{\infty} \frac{1}{(x+a)\sqrt{x-1}} dx$$

Example 2

Evaluate the following integral.

$$\int_0^{\infty} \frac{1}{1+e^{ax}} dx$$

Example 3

Evaluate the following integral.

$$\int_0^{\infty} \ln \left(1 + \frac{a^2}{x^2} \right) dx$$

Example 4

Evaluate the following integral.

$$\int_{\sqrt{2}}^{\infty} \frac{1}{x + x\sqrt{2}} dx$$

In case you've forgotten, recall the hyperbolic functions: $\cosh x := \frac{e^x + e^{-x}}{2}$ and $\sinh x := \frac{e^x - e^{-x}}{2}$.

Example 5

Evaluate the following integral.

$$\int_{-\infty}^{\infty} \frac{dx}{\cosh x}$$
