

PRINT Your Name: \_\_\_\_\_

**Quiz 4 — February 3, 2012 – Section 7 – 11:15 – 12:05**

**Remove everything from your desk except this page and a pencil or pen.**

**Circle** your answer. **Show your work. Check your answer.**

The quiz is worth 5 points.

Find  $\int \frac{dx}{1+e^x}$ .

**Answer:** Let  $u = 1 + e^x$ . Calculate  $du = e^x dx$ . It follows that  $\frac{du}{(u-1)} = dx$ . The original integral is

$$\begin{aligned} \int \frac{du}{(u-1)u} &= \int \left( \frac{1}{u-1} - \frac{1}{u} \right) du = \ln|u-1| - \ln|u| + C = \ln(e^x) - \ln(1+e^x) + C \\ &= \boxed{x - \ln(1+e^x) + C}. \end{aligned}$$

Check. The derivative of the proposed answer is

$$1 - \frac{e^x}{1+e^x} = \frac{(1+e^x) - e^x}{1+e^x}. \checkmark$$