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**Quiz – February 28, 2006**

Find  $\int_0^{+\infty} e^{-2x} dx$ .

**Answer:** We see that

$$\begin{aligned}\int_0^{+\infty} e^{-2x} dx &= \lim_{b \rightarrow \infty} \int_0^b e^{-2x} dx = \lim_{b \rightarrow \infty} \left. \frac{e^{-2x}}{-2} \right|_0^b = \lim_{b \rightarrow \infty} \frac{e^{-2b}}{-2} - \frac{1}{-2} \\ &= \lim_{b \rightarrow \infty} \frac{1}{-2e^{2b}} - \frac{1}{-2} = \boxed{\frac{1}{2}}.\end{aligned}$$