Calculus I Name:_____
TA/classroom:_____ Student ID:_____

Quiz 11

Jan. 2, 2008

1. (10 pts) Evaluate the integral

$$\int_1^4 \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx$$

(By Substitution) Let $u = \sqrt{x}$ and $du = \frac{1}{2\sqrt{x}}dx$. Then

$$\begin{aligned}\int_1^4 \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx &= \int_1^4 2\frac{e^{\sqrt{x}}}{2\sqrt{x}}\,dx \\ &= \int_{u=1}^{2} 2e^u\,du \\ &= 2e^u|_1^2 = 2e^2 - 2e \\ \text{or } &= 2e^{\sqrt{x}}|_{x=1}^4 = 2e^2 - 2e\end{aligned}$$

2. (10 pts) Evaluate the integral

$$\int x^2 \ln x\,dx$$

(Integration By Parts) Let $u = \ln x$ and $dv = x^2\,dx$. Then $du = \frac{1}{x}\,dx$ and $v = \frac{1}{3}x^3$.

$$\begin{aligned}\int x^2 \ln x\,dx &= \frac{1}{3}x^3 \ln x - \int \frac{1}{3}x^3 \cdot \frac{1}{x}\,dx \\ &= \frac{1}{3}x^3 \ln x - \frac{1}{9}x^3 + C\end{aligned}$$