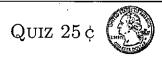
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MATH 200December 5, 2023

1. 
$$\int \cos(1+e^x)e^x dx = \int \cos(u) du = \sin(u) + C = \left[\sin(1+e^x) + C\right]$$

$$\begin{cases} u = 1 + e^{x} \\ du = 0 + e^{x} \\ du = e^{x} dx \end{cases}$$

2. 
$$\int e^{1-\cos(x)}\sin(x)\,dx = \int e^{u}\,du = e^{u}+C = \left[e^{1-\cos(x)}+C\right]$$

$$\frac{\partial u = 1 - \cos(x)}{\partial x} = 0 + \sin(x)$$

$$du = \sin(x) dx$$

3. 
$$\int \sec\left(\frac{1}{x}\right) \tan\left(\frac{1}{x}\right) \frac{1}{x^2} dx = \int \sec(u) \tan(u)(-1) du = -\int \sec(u) \tan(u) du$$

$$\frac{du}{dx} = -\frac{1}{x^2}$$

$$du = -\frac{1}{x^2}dx \quad \text{and} \quad -du = \frac{1}{x^2}dx$$

$$du = -\frac{1}{x^2} dx$$
  $dx = \frac{1}{x^2} dx$ 

4. 
$$\int_0^{\frac{\sqrt{\pi}}{2}} x \sin(x^2) dx = \int_0^{\sqrt{17/2}} \sin(x^2) \chi dx -$$

$$\int_{0^{2}}^{\left(\frac{\pi}{2}\right)} \sin\left(u\right) \frac{1}{2} du$$

-sec(u) + C

$$\frac{du}{dx} = 2x$$

$$= \frac{1}{2} \int_{0}^{\frac{\pi}{4}} \sin(u) du$$

$$du = 2x dx$$

$$= \frac{1}{2} \left( \cos \left( \frac{\pi}{4} \right) - \left( -\cos \left( o \right) \right) \right) = \left[ \frac{1}{2} \left( -\frac{\sqrt{2}}{2} + 1 \right) \right]$$