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QUIZ 25¢

MATH 200
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1. $\int \cos(1+e^x)\,e^x\,dx =$ $\int \cos(u)\,du = \sin(u)+C = \boxed{\sin(1+e^x)+C}$

$u = 1+e^x$

$\frac{du}{dx} = 0+e^x$

$du = e^x\,dx$

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

$u = 1-\cos(x)$

$\frac{du}{dx} = 0+\sin(x)$

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

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

$= -\sec(u)+C$

$= \boxed{-\sec\left(\frac{1}{x}\right)+C}$

$u = \frac{1}{x}$

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

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

4. $\int_0^{\frac{\sqrt{\pi}}{2}} x\sin(x^2)\,dx =$ $\int_0^{\sqrt{\pi}/2} \sin(x^2)\,x\,dx = \int_{0^2}^{\left(\frac{\sqrt{\pi}}{2}\right)^2} \sin(u)\,\frac{1}{2}\,du$

$= \frac{1}{2}\int_0^{\frac{\pi}{4}} \sin(u)\,du = \frac{1}{2}\Big[-\cos(u)\Big]_0^{\frac{\pi}{4}}$

$= \frac{1}{2}\left(-\cos\left(\frac{\pi}{4}\right)-(-\cos(0))\right) = \boxed{\frac{1}{2}\left(-\frac{\sqrt{2}}{2}+1\right)}$

$u = x^2$

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

$du = 2x\,dx$

$\frac{1}{2}du = x\,dx$