Exam #1 Correction and Additional Note

#4 I flubbed $\frac{d}{du}(\sin u) = \cos u$. I should have gotten

$$\vec{\nabla} \times \vec{F} = (\cos(2yz)(2z) - \cos(2yz)(2y, 0, 0\rangle$$

$$= 2(z-y)\cos(2yz)\,\hat{\imath} \neq \vec{0} \text{ in general}$$

#8 Some of you noticed that the integral is improper: $e^{(y-x)/(y+x)}$ becomes $e^{0/0}$ at $(0,0)$. Let's see how this plays out after the substitution: in D^* there is a bad point again at $(0,0)$. The easiest way to take care of this is

$$\int_0^1 \int_{-v}^{v} \frac{1}{2} e^{u/v}\, du\, dv = \lim_{\delta \to 0^+} \int_{\delta}^{1} \int_{-v}^{v} \frac{1}{2} e^{u/v}\, du\, dv,$$

but after the inner integration is done, the problem disappears! (The u and dv cover over the bad $1/v$.)