Exam #1 Correction and Additional Note

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

\[ \nabla \cdot \vec{F} = (\cos(2yz))(2z) - \cos(2yz)(2y) = 2(z-y)\cos(2yz) \hat{i} \neq 0 \text{ in general} \]

#8 Some of you noticed that the integral is improper: \( y-x+y+x \) becomes \( \infty \) 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

\[ \int \int_{\frac{1}{2}} e^{uv} \, du \, dv = \lim_{\delta \to 0^+} \int \int_{D^*} e^{uv} \, du \, dv \]

but after the inner integration is done, the problem disappears! (The \( u \) and \( dv \) covers over the bad \( uv \))

\[ x+y=1 \]

\[ x+y=8 \]