1. Compute the curl of the vector field $\mathbf{F}(x,y,z) = x^2\mathbf{i} - e^{xyz}\mathbf{j} + \cos y \ \mathbf{k}$.

2. Compute the divergence of the vector field $\mathbf{F}(x,y,z) = x^2\mathbf{i} - e^{xyz}\mathbf{j} + \cos y \ \mathbf{k}$.

1. Compute the curl of the vector field $\mathbf{F}(x,y,z) = K(x^2+y^2+z^2)^{-3/2}(x\mathbf{i}+y\mathbf{j}+z\mathbf{k})$.

2. Compute the divergence of the vector field $\mathbf{F}(x,y,z) = K(x^2+y^2+z^2)^{-3/2}(x\mathbf{i}+y\mathbf{j}+z\mathbf{k})$.

[Note: Vector fields of this sort may be used to model photon flow from a star or neutrino flow from a supernova. Wow.]