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 $\mathbf{F}(x,y,z) = K\left(x^2 + y^2 + z^2\right)^{-3/2}\left(z\mathbf{i} + y\mathbf{j} + z\mathbf{k}\right)$.

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

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