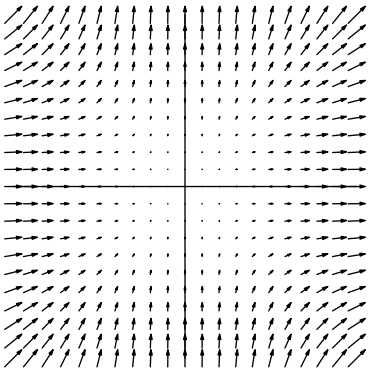
18.022 Recitation Quiz (with solutions)
22 October 2014

1. Sketch the vector field $\mathbf{F} = \langle x^2, y^2 \rangle$.



2. On what subset of $\mathbb{R}^2$ is the divergence of $\mathbf{F} = \langle x^2, y^2 \rangle$ positive?

Solution. The inequality $\nabla \cdot \mathbf{F} > 0$ is equivalent to $2x + 2y > 0$, which happens above the line $y = -x$.

3. Comment on the relationship between the previous two questions.

Solution. Above the line $y = -x$, the flow away from a point exceeds the flow toward the point. So the picture in question 1 is consistent with the calculation in question 2.