Homework Section 16.1

In problems 1-4, match up the given vector field **F** with one of the plots, (a)-(d). Explain your reasoning.

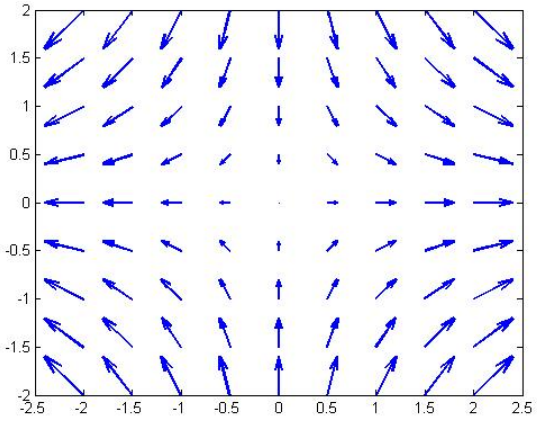
1. $\mathbf{F}(x,y) = \langle -x, -y \rangle$

2. $\mathbf{F}(x,y) = \langle x, -y \rangle$

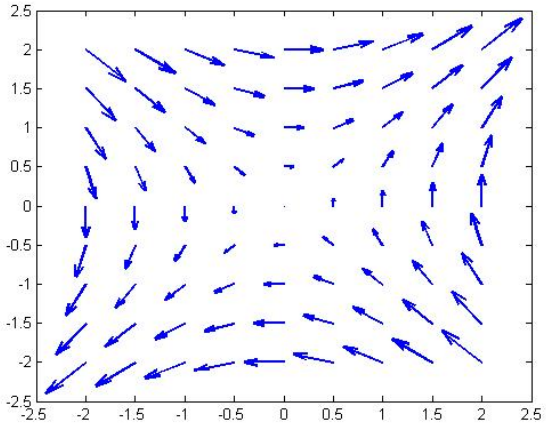
3. $\mathbf{F}(x,y) = \langle y, -x \rangle$

4. $\mathbf{F}(x,y) = \langle y, x \rangle$

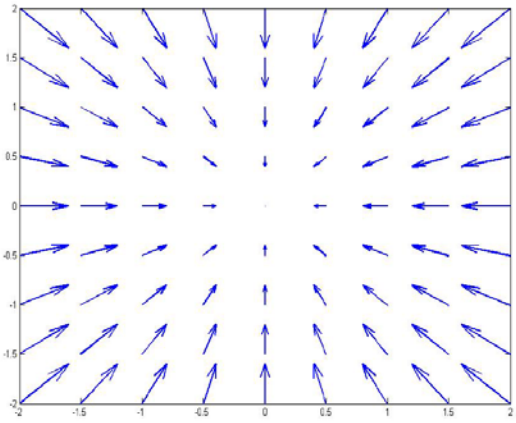
a)



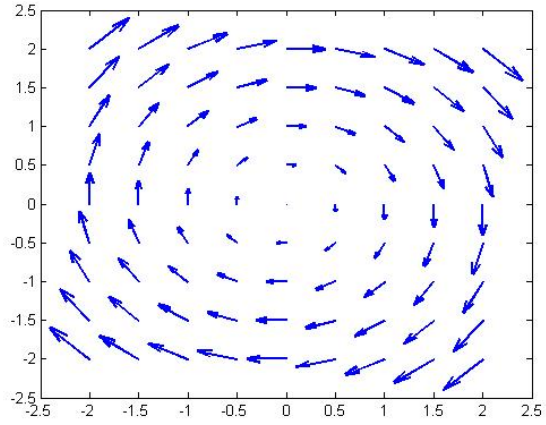
b)



c)



d)



5. Sketch the vector field:

a) $\mathbf{F}(x,y) = \frac{1}{2}\mathbf{i} + x\mathbf{j}$

b) $\mathbf{F}(x,y) = \dfrac{-y\mathbf{i} + x\mathbf{j}}{\sqrt{x^2 + y^2}}$

c) $\mathbf{F}(x,y,z) = 2\mathbf{k}$

6. Find the gradient vector field, $\nabla f(x,y)$:

a) $f(x,y) = \ln(2x + y)$

b) $f(x,y,z) = y\sin(\frac{x}{z})$