Math 53 Discussion Problems Nov 14

1. Sketch the following vector fields

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

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

   (c) $\mathbf{F}(x, y, z) = \frac{1}{x^2+1}\mathbf{k}$

   (d) The gradient vector field of $f(x, y) = \frac{y}{x}$, on the open first quadrant

   (e) The gradient vector field of $f(x, y, z) = x^2 + y^2 - z$