17.3: Vector Fields

Calculus III

College of the Atlantic

What do the following vector fields look like? For each field, sketch 5–10 vectors and see if you can get a general feel for what it looks like. Then use WolframAlpha to plot the field and contemplate for a moment.

1. $\vec{F}(x,y) = 0\vec{i} + x\vec{j}$
2. $\vec{F}(x,y) = x\vec{i} + y\vec{j}$
3. $\vec{F}(x,y) = y\vec{i} + x\vec{j}$
4. $\vec{F}(x,y) = x\vec{i} - y\vec{j}$
5. $\vec{F}(x,y) = \frac{x\vec{i}}{x^2+y^2} + \frac{y\vec{j}}{x^2+y^2}$

For each of the following functions, calculate the gradient vector field and sketch it:

1. $f(x,y) = 17 + 3x - 2y$
2. $g(x,y) = -10 + x^2 + y^2/4$