

Math 53 Quiz 8

11 April 2008

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Name: _____

Time (circle one):

12:10 - 1:00

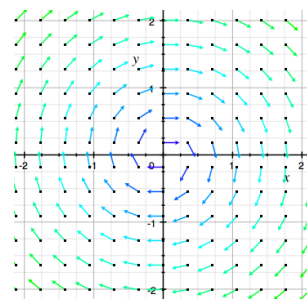
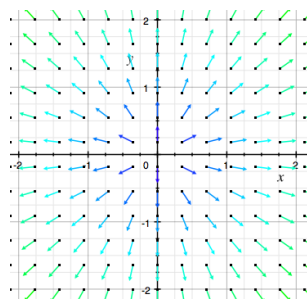
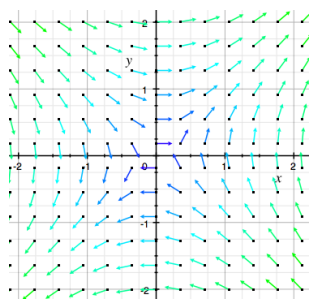
3:10 - 4:00

Please use extra paper as necessary. For each part, partial credit will be assigned based on correct work (you do need to show some work, enough so that I know how you solved the problem). Please simplify and box your answers.

Consider the vector field:

$$\vec{v}(x, y) = y\vec{i} + x\vec{j}$$

- a. (1 pt) Which of the following is a graph of \vec{v} ?



(Note: My graphing calculator displays only the direction of vectors, normalizing each to a unit vector, and displaying the magnitude as a color. But this is a black-and-white printer.)

- b. (5 pt) Consider the path $\vec{r}(t) = (x(t), y(t)) = (1 + t, 3 - t)$ as t ranges from 0 to 1. Compute directly the line integral

$$\int_{\text{path}} \vec{v}(\vec{r}) \cdot d\vec{r}$$

(I.e. set up the integral in terms of t and use the methods of 13.2, but not 13.3.)

- c. (4 pt) Is there a function $F(x, y)$ so that $\vec{v}(x, y) = \vec{\nabla}F$? If so, find such a function, and evaluate $F(2, 2) - F(1, 3)$. If not, explain why not.