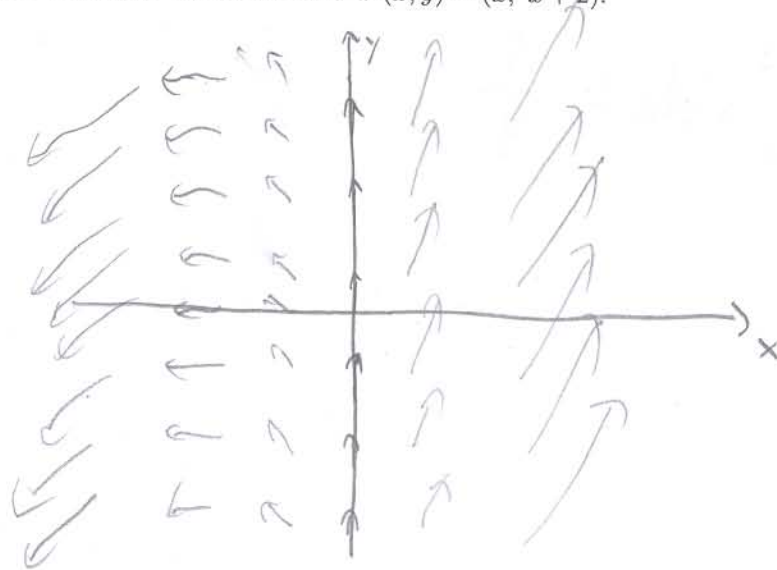


Quiz 3 - ~~Thursday~~ (math 32b)

Tuesday Quiz Solutions

February 17, 2009

Problem 1. Sketch the vector field  $\vec{F}(x, y) = (x, x+2)$ .



constant on vertical lines

**Problem 2.** Find the integral  $\int_C xdy - ydx$ , where  $C$  is the part of the parabola  $y = x^2$  between the points  $(0,0)$  and  $(2,4)$ .

parametrize  $C$  by  $\vec{r}(x) = \langle x, x^2 \rangle$ ,  $0 \leq x \leq 2$ .

$$\vec{r}'(x) = \langle 1, 2x \rangle$$

$$\int_0^2 [x(2x) - x^2(1)] dx$$

$$= \int_0^2 x^2 dx = \frac{8}{3}$$

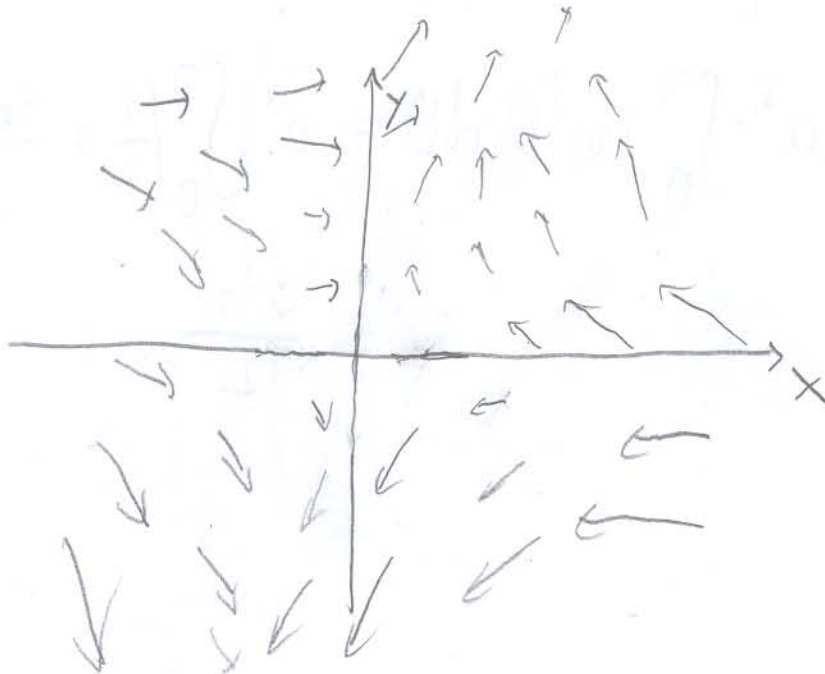
Quiz 3 - Thursday (math 32b)

Quiz Solutions

February 17, 2009

Problem 1. Sketch the vector field  $\vec{F}(x, y) = \langle y-x, x+y \rangle$ .

$(y-x, x+y)$



Problem 2. Find the integral  $\int_C x^2 ds$ , where  $C$  is the part of the parabola  $y = x^2$  between the points  $(0, 0)$  and  $(2, 4)$ .

upper semicircle  $x^2 + y^2 = a^2$ ,  $y \geq 0$ .

parametrize  $C$  by  $\vec{r}(\theta) = \langle a \cos \theta, a \sin \theta \rangle$

$$0 \leq \theta \leq \pi.$$

$$\int_0^\pi a^2 \cos^2 \theta \sqrt{(a \sin \theta)^2 + (a \cos \theta)^2} d\theta$$

$$= a^3 \int_0^\pi \cos^2 \theta d\theta = a^3 \int_0^\pi \left( \frac{1}{2} + \frac{\cos 2\theta}{2} \right) d\theta$$

$$= \frac{a^3 \pi}{2}$$

period  $\pi$ ,  
avg value  $\frac{1}{2}$ .