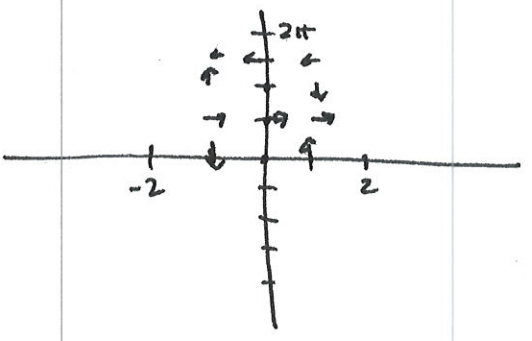
MTH 277, Quiz #4, Spring 2018 Name KEY

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Sketch the vector field $\vec{F}(x,y) = \sin y\,\hat{\imath} + x\cos y\,\hat{\jmath}$. Plot at least 10 points. You may use technology to fill in a larger field.

x	y	F
0	0	$\langle 0,0\rangle$
1	$\pi/2$	$\langle 1,0\rangle$
0	$\pi/2$	$\langle 1,0\rangle$
-1	$\pi/2$	$\langle 1,0\rangle$
0	π	$\langle 0,0\rangle$
1	π	$\langle 0,-1\rangle$
-1	π	$\langle 0,1\rangle$
0	$3\pi/2$	$\langle -1,0\rangle$
1	$3\pi/2$	$\langle -1,0\rangle$
-1	$3\pi/2$	$\langle -1,0\rangle$
1	0	$\langle 0,1\rangle$
-1	0	$\langle 0,-1\rangle$

See attached



2. Find the value of the line integral $\int_C xyds$ on the path $\vec{r}(t) = t\hat{\imath} + (2-t)\hat{\jmath}$ on the interval $t \in [0,2]$.

$r'(t) = 1\hat{\imath} - \hat{\jmath}$

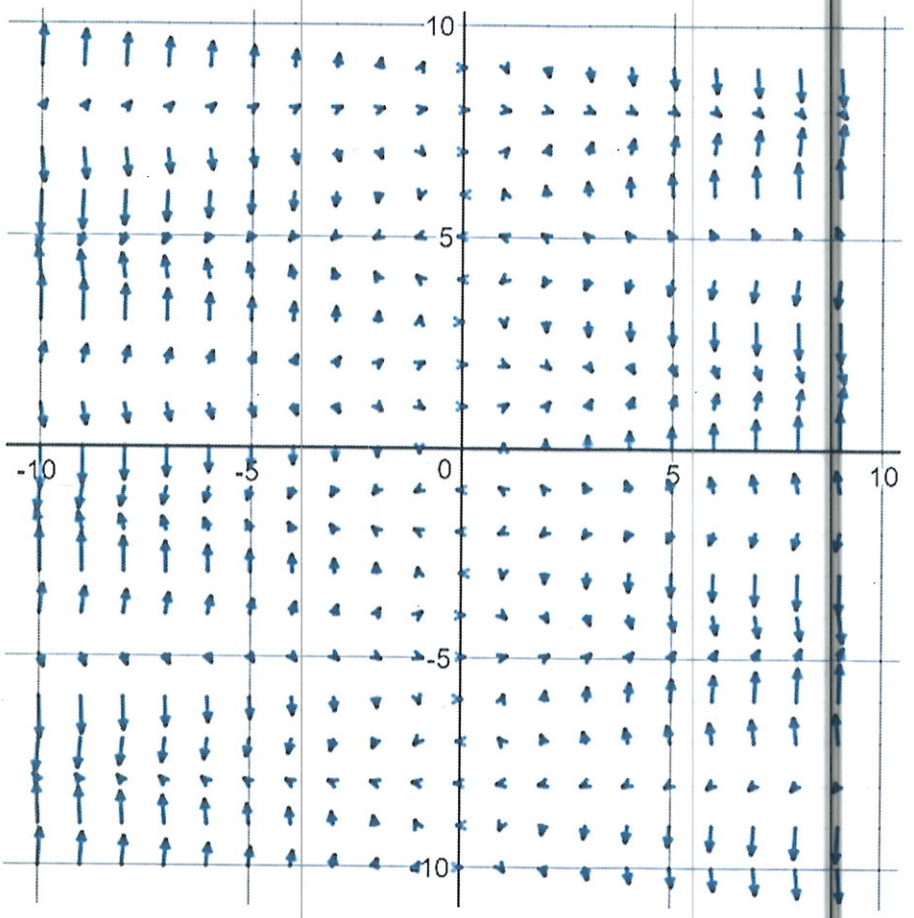
$\|r'(t)\| = \sqrt{1^2+1^2} = \sqrt{2}$

$$\int_0^2 t(2-t)\sqrt{2}\,dt$$

$$= \sqrt{2}\int_0^2 2t - t^2\,dt$$

$$= \sqrt{2}\left[t^2 - \frac{1}{3}t^3\right]_0^2 =$$

$$\sqrt{2}\left[4 - \frac{8}{3} - 0\right] = \boxed{\frac{4\sqrt{2}}{3}}$$


10
5
-10
-5
0
5
10
-5
-10