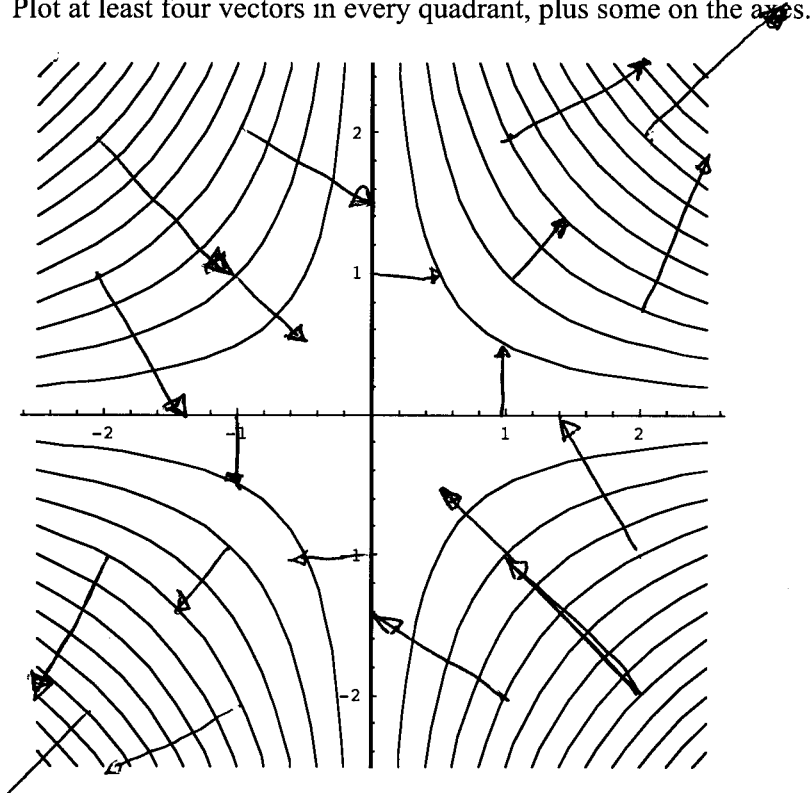


- (10 pts) 7. Level curves for $f(x,y) = \frac{xy}{2}$ are shown below. On the same picture, accurately sketch the vector field $\mathbf{v} = \nabla f$. Plot at least four vectors in every quadrant, plus some on the axes.



8) $\mathbf{r}(t) = (-\cos t, \sin t)$ t from 0 to π

9) $\mathbf{F} = 2x\mathbf{i} + z\mathbf{j} + y\mathbf{k}$ is conservative with potential $\varphi = x^2 + zy$

$$\int_{(-1,4,0)}^{(3,0,7)} 2x dx + z dy + y dz = \varphi(3,0,7) - \varphi(-1,4,0) = 9 - 1 = 8$$

10) Using Green's Thm,

$$\int_C \mathbf{F} \cdot d\mathbf{r} = \iint_R (2x + 3) dx dy = \int_0^3 \int_0^8 (2x + 3) dx dy = \int_0^3 (x^2 + 3x) \Big|_0^8 dy$$

$$= \int_0^3 88 dy = 264$$