

MATH 275 – Section 003 – Quiz 7

You may work with other class members on this quiz, but you may *not* receive assistance from people not in MATH 275 (Section 003). You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or **YOU WILL GET A 'ZERO' ON THE QUIZ**. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by Monday, 22 November 2004 at 1900. **GOOD LUCK!**

Let $\mathbf{F}(x, y) = \begin{bmatrix} -y \\ -y \end{bmatrix}$ be a velocity field. Let C be the circle of radius 1, centered at the origin.

a) Draw a large, detailed picture which shows both \mathbf{F} and C on the same set of axes.

b) Based **only** on your picture, predict whether the circulation of \mathbf{F} around C is positive, negative, or zero. Precisely explain your reasoning.

c) Based **only** on your picture, predict whether the flux of \mathbf{F} across C is positive, negative, or zero. Precisely explain your reasoning.

d) Calculate the circulation of \mathbf{F} around C . Does your answer agree with your prediction?

e) Calculate the flux of \mathbf{F} across C . Does your answer agree with your prediction?

f) If you did your calculations correctly, you should notice something interesting when comparing the result of the circulation calculation to the result of the flux calculation. Could you have predicted this from your picture? Explain.