

Basic Information

This assignment is due on Gradescope by **3 PM on Tuesday, December 3**.

Make sure you understand MHC [honor code](#) and have carefully read and understood the additional information on the [class syllabus](#). I am happy to discuss any questions or concerns you have!

Since this is a 200-level mathematics course, quite a few homework questions will ask you to explain your reasoning or process for solving a problem. Whenever possible, write your explanations in complete sentences and write your answers as if you were explaining to a peer in the class.

The homework problems will be graded anonymously so please do not put your name or other identifying information on the pages.

Turn In Problems

14.2: 12, 16 I will talk about divergence briefly on Monday, but you can see the definition on pg. 853 in the meantime

14.3: 14, 18

#5¹ Let \vec{F} be the vector field shown in Figure A on the next page.

(a) If C_1 is the vertical line segment from $(-3, -3)$ to $(-3, 3)$ determine whether

$\int_{C_1} \vec{F} \cdot d\vec{r}$ is positive, negative, or zero. Explain your answer.

(b) If C_2 is the counterclockwise-oriented circle with radius 3 and center the origin,

determine whether $\int_{C_1} \vec{F} \cdot d\vec{r}$ is positive, negative, or zero. Explain your answer.

#6 Figure B on the next page shows the vector field $\vec{F}(x, y) = \langle 2xy, x^2 \rangle$ and three curves that start at $(1, 2)$ and end at $(3, 2)$.

(a) Explain why $\int_C \vec{F} \cdot d\vec{r}$ has the same value for all three curves.

(b) What is this common value?

Additional Problems (to do on your own, not to turn in)

14.2: 11, 15

14.3: 15, 17

Figure C on the next page shows a vector field \vec{F} and two curves C_1 and C_2 . Are the line integrals of \vec{F} over C_1 and C_2 positive, negative, or zero? Explain.

¹ Problem #5 and #6 and last Additional Problem from James Stewart's Calculus: Early Transcendentals 6th edition.

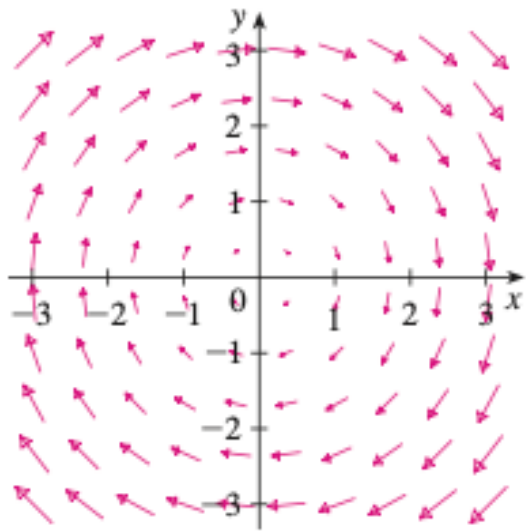


Figure A

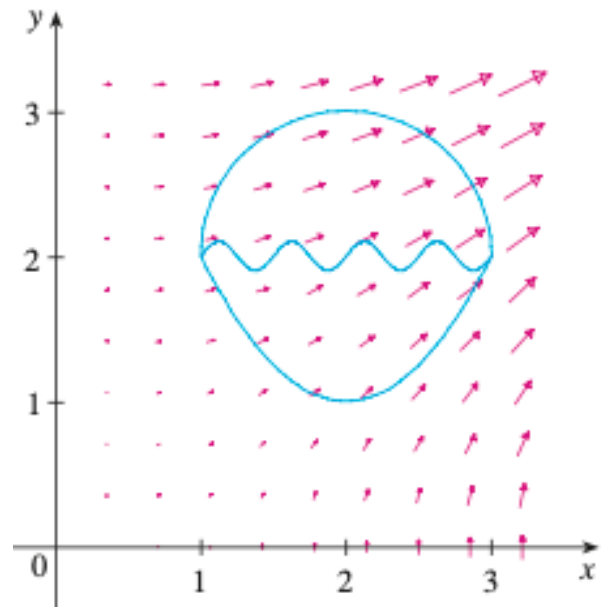


Figure B

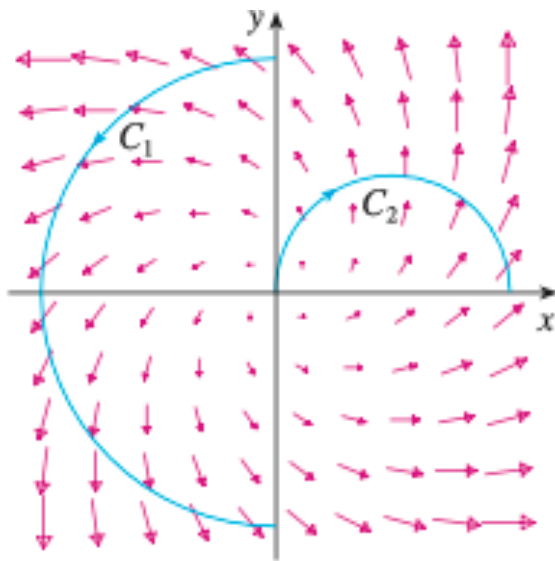


Figure C