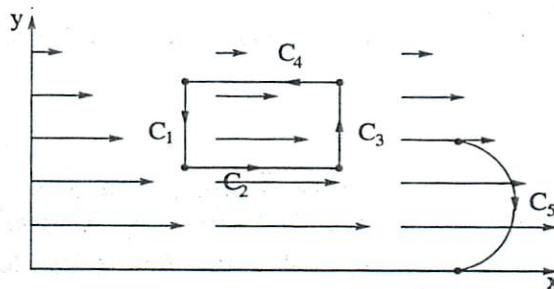# Worksheet 18.1: The Idea of a Line Integral

Given below is the vector field $\vec{F}(x, y)$ and several oriented curves.

1. Arrange the following line integrals in order from smallest to largest.

   (a) 0   (b) $\int_{C_1} \vec{F} \cdot d\vec{r}$ (c) $\int_{C_2} \vec{F} \cdot d\vec{r}$ (d) $\int_{C_3} \vec{F} \cdot d\vec{r}$ (e) $\int_{C_4} \vec{F} \cdot d\vec{r}$ (f) $\int_{C_5} \vec{F} \cdot d\vec{r}$

2. Let C be the closed curve $C_1 + C_2 + C_3 + C_4$. Is

$$\oint_C \vec{F} \cdot d\vec{r} = \int_{C_1} \vec{F} \cdot d\vec{r} + \int_{C_2} \vec{F} \cdot d\vec{r} + \int_{C_3} \vec{F} \cdot d\vec{r} + \int_{C_4} \vec{F} \cdot d\vec{r}$$

positive, negative of zero? Explain your answer.

3. Is $\int_{C_5} \vec{F} \cdot d\vec{r}$ positive or negative? Explain your answer?