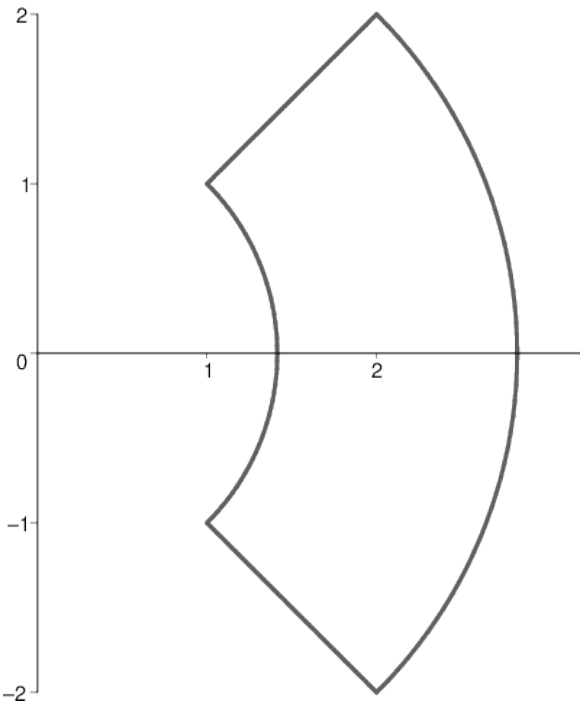


Figure 1: Path for Problem Circulation I

1 Circulation I

The *circulation* of a vector field $\vec{\boldsymbol{F}}$ around a closed curve C is given by

$$\oint_C \vec{\boldsymbol{F}} \cdot d\vec{\boldsymbol{r}}$$

For each of the vector fields below, explain whether you expect the given vector field to have positive, negative, or zero circulation *counterclockwise* around the closed curve C shown in the figure. Two of the segments of C are circular arcs centered at the origin; the other two are radial line segments.

I. $\vec{\boldsymbol{G}} = x\,\hat{\boldsymbol{x}} + y\,\hat{\boldsymbol{y}}$

II. $\vec{\boldsymbol{H}} = y\,\hat{\boldsymbol{x}} - x\,\hat{\boldsymbol{y}}$