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1. Consider the rectangle in the first quadrant of the xy-plane as in the figure with thick black lines.
   - Label the bottom horizontal edge of the rectangle $y = c$.
   - Label the sides of the rectangle Δx and Δy.
   - What is the area of the rectangle?
   - There are also 2 rectangles whose base is the x-axis, the larger of which contains both the smaller and the original rectangle. Express the area of the original rectangle as the difference between the areas of these 2 rectangles.

2. On the grid below, draw any simple, closed, piecewise smooth curve C, all of whose segments C_i are parallel either to the x-axis or to the y-axis. Your curve should **not** be a rectangle. Pick an origin and label it, and assume that each square is a unit square.

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   - Compute the area of the region D inside C by counting the number of squares inside C.
   - Evaluate the line integral $\oint_C y\,\hat{\boldsymbol{x}} \cdot d\vec{\boldsymbol{r}}$ by noticing that along each segment either x or y is constant, so that the integral is equal to $\sum_{C_i} y\,\Delta x$.
     Can you relate this to Problem 1?
   - Are your answers to the preceding two calculations the same?
   - Would any of your answers change if you replaced $y\,\hat{\boldsymbol{x}}$ by $x\,\hat{\boldsymbol{y}}$ in part (b)?