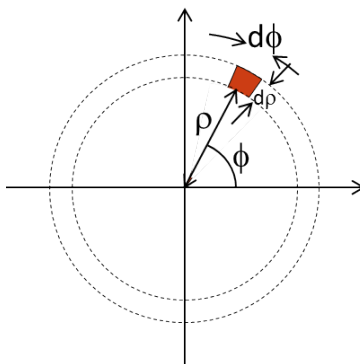


Discovery Exercise for Double Integrals in Polar Coordinates

The drawing below shows a small region within some small $d\rho$ at a distance ρ from the origin, and some small $d\phi$ at an angle ϕ off the positive x -axis. Your job is to find the area dA of this region.



1. We begin by ignoring ϕ and looking at the entire ring between the two dotted lines. If this ring were cut at the bottom and stretched up into a rectangle, what would be the width and length of this rectangle? What would be its area?
2. What fraction of the ring is represented by our region?
3. Based on those two answers, what is the area of the region dA ?