

# MA205 - Integral Calculus

## Lesson 29: Polar Regions I

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1. An obvious region that is better described by polar coordinates is a *polar rectangle*. Sketch the following polar rectangles.

a.  $0 \leq r \leq 1, 0 \leq \theta \leq 4\pi/3$

b.  $1 \leq r \leq 2, -3\pi/4 \leq \theta \leq \pi/2$

2. Suppose  $R$  is the region in the first quadrant bounded by  $x^2 + y^2 = 1$  and  $x^2 + y^2 = 9$ . Sketch this region, and describe it using inequalities in terms of  $r$  and  $\theta$ .

3. Integrate the function  $f(x, y) = 1 - x^2 - y^2$  over the region pictured below using polar coordinates.

