

## Math 53 Discussion Problems Sept 10

1. Sketch the described regions and find their areas.

(a) Bounded by the circle  $r = 2 \sin \theta$  for  $\frac{\pi}{4} \leq \theta \leq \frac{\pi}{2}$ .

(b) Inside the six-leaved rose  $r^2 = 2 \sin(3\theta)$ .

(c) Inside the circle  $r = 4 \sin \theta$  and below the line  $r = 3 \csc \theta$ .

2. Find the lengths of the polar curves.

(a)  $r = 1 + \cos \theta$

(b)  $r = 8 \sin^3\left(\frac{\theta}{3}\right), 0 \leq \theta \leq \frac{\pi}{4}$

(c)  $r = \frac{6}{1 + \cos \theta}, 0 \leq \theta \leq \frac{\pi}{2}$