

Name: \_\_\_\_\_

## Quiz 8: Polar Coordinates

**Formulae:** Recall the formula you *certainly* already have memorized for the final:

$$A = \frac{1}{2} \int_a^b r(\theta)^2 d\theta$$

and this formula

$$\cos^2 \theta = \frac{1 + \cos 2\theta}{2}$$

**Problem 1:** Find the area of the region inside the circle  $r = 2 \cos \theta$  but outside the circle  $r = 1$ .  
[You should draw the picture of these circles first.]

**Problem Bonus:** Does the following series diverge or converge? You do not need to justify explicitly why, just give a plausible argument. [Hint: What grows faster - polynomials or logs?]

$$\sum_{n=25}^{\infty} \frac{1}{\ln(\ln(\ln(n)))}$$