

Math 181
Fall, 2008

Name _____

Homework #13

Due Monday, October 27

No late papers accepted! No excuses!

1. Find the area of the region inside the “figure eight” $r = 1 + \cos(2\theta)$ and outside the circle $r = 1$.

2. Find the length of the curve given by $r = \sqrt{1 + \cos(2\theta)}$ on the interval $-\pi/2 \leq \theta \leq \pi/2$

2. Which of the sequences whose n th term are given converge, and which diverge?
Find the limit of each convergent sequence.

a) $a_n = \frac{\ln(2n^3 + 1)}{n}$

b) $a_n = \frac{(-4)^n}{n!}$

c) $a_n = \left(\frac{3}{n}\right)^{\frac{1}{n}}$

4. Determine which series converge and which diverge. Give reasons for your answers. If a series converges, find its sum.

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

b) $\sum_{n=1}^{\infty} \frac{2n+1}{n^2(n+1)^2}$

c) $\sum_{n=0}^{\infty} \frac{\cos(n\pi)}{5^n}$