Math 1272
Quiz 7
Thursday 2 April 2015

Scientific calculators are allowed but not required. Calculators with graphing and computer algebra capabilities are not allowed. Show your work and give exact answers.

1. (8 points) Sketch the the polar equation given below. Start by graphing \( r \) as a function of \( \theta \).

\[
\text{graph} = 3 \rho \text{t s}
\]

\[
\rho \left( 1 - 2 \sin \theta \right)
\]

[Graph of \( r \) as a function of \( \theta \)]

\[\text{Draw grid = 1 pt}\]

2. (8 points) Find the area enclosed by the curve \( r = 1 - 2 \sin \theta \)

\[
\text{Set up 2 pts} = \frac{1}{2} \int_0^{2\pi} ( (1 - 2 \sin \theta)^2 d\theta = \frac{1}{2} \int_0^{2\pi} (4 + 4 \sin^2 \theta - 8 \sin \theta) d\theta
\]

\[
= \frac{1}{2} \left( \int_0^{2\pi} 4 \, d\theta + \int_0^{2\pi} \frac{4}{2} (1 - \cos(2\theta)) d\theta \right) - \frac{1}{2} \int_0^{2\pi} 8 \sin \theta \, d\theta
\]

\[= \frac{1}{2} \left( \int_0^{2\pi} d\theta + \int_0^{2\pi} \cos(2\theta) \, d\theta \right) - 4 \int_0^{2\pi} \sin \theta \, d\theta
\]

\[= \frac{3\pi}{2} - \frac{1}{2} \sin(2\theta) \right|_0^{2\pi} - 4 \cos \theta \right|_0^{2\pi} = 6\pi
\]

\[\text{2 pts}\]
3. (0 points) Find a formula for the general term, $a_n$, of the sequence, assuming the pattern of the first few terms continues.

\[
\left\{ \frac{(-1)^n (n+1)^2}{n+2} \right\}_{n=0}^{\infty}
\]

or

\[
\left\{ \frac{(-1)^{n+1} n^2}{n+1} \right\}_{n=1}^{\infty}
\]