Polar Propellers

Consider the polar curve $r = 2 + \cos 4\theta$ for $0 \leq \theta \leq 2\pi$.

1. Graph this curve and determine the points farthest from the origin. What values of θ give these points?

2. Determine the points closest to the origin. What values of θ give these points?

3. Find the area bounded by this polar curve.

4. Set up the integral for the length of this polar curve.