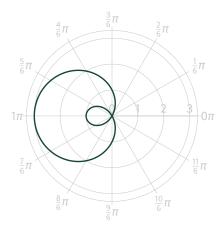
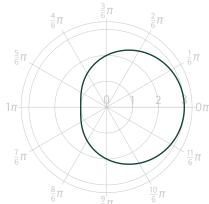
Math 143 Quiz 4

1. Find the area in the little loop of the graph $r = 1 - 2\cos\theta$:



2. Find the value of α such that the arclength of the polar curve $r(\theta) = 1 - \theta^2$ on $[0, \alpha]$ is 2α .



3. When does the polar curve $r=2+\cos\theta$ have a vertical tangent? ₁₇₇-

4. The vector \mathbf{v} below is a unit vector and the vector \mathbf{w} is in the direction of $\langle -1,3 \rangle$. What is \mathbf{w} ?

