Sec 10.3 (Day 2):
The Calculus of Polar Curves

Now let's look at some Calculus for polar graphs. What if we want to find the slope of the tangent line to a polar graph? Let's see.

$$\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{\frac{d}{d\theta}[\_\_\_\_\_]}{\frac{d}{d\theta}[\_\_\_\_\_]} = \_\_\_\_\_$$

Find the slope of the graph of the polar curve at the given value. $r = 3 + 2\sin\theta, \ \theta = \frac{\pi}{6}$

Find the points of horizontal and vertical tangency to the graph of $r = 2 - 2\cos\theta$

$$A = \frac{1}{2}\int_{\alpha}^{\beta} r^2 d\theta$$

Find the area bounded by the graph of $r = 2 + 2\sin\theta$

Find the area of one petal of $r = 2\sin 3\theta$

Find the area of one petal of $r = 4\cos 2\theta$

Find the area inside $r = 3\sin\theta$ and outside $r = 2 - \sin\theta$

Find the area of the common interior of $r = 3\cos\theta$ and $r = 1 + \cos\theta$

Set up the integral that will find the area of the region common to the interiors of $r = -6\cos\theta$ and $r = 2 - 2\cos\theta$