

AP Calculus BC

Graphing Polar Functions

Cartesian Trig Functions

What do a , b , and c do?

$$y = a + b \sin(cx)$$

a = shift up or down

b = vertical stretch/shrink (amplitude)

c = horizontal shrink/stretch
(frequency - # of periods in 2π)

Now, to graphing Polar!

From yesterday,

We've already talked about what happens when either r or θ is a constant

$$r = a \text{ (Ex: } r=3\text{)}$$

Forms a Circle

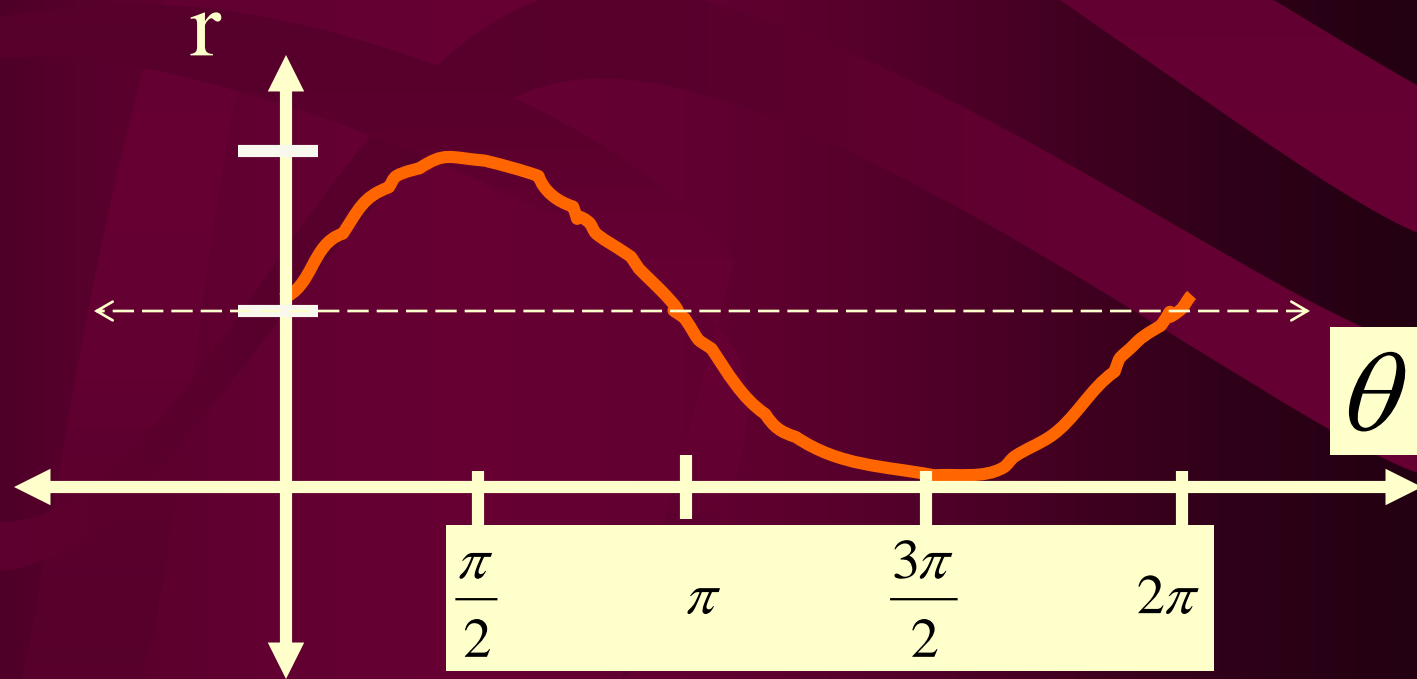
With origin at the Pole

$$\theta = b \text{ (} \theta = \frac{\pi}{3} \text{)}$$

Forms a Line
Through the Pole

Instead of making a T-chart of values like yesterday, let's first sketch the polar graph in Cartesian coordinates.

Ex/ $r = 1 + \sin \theta$



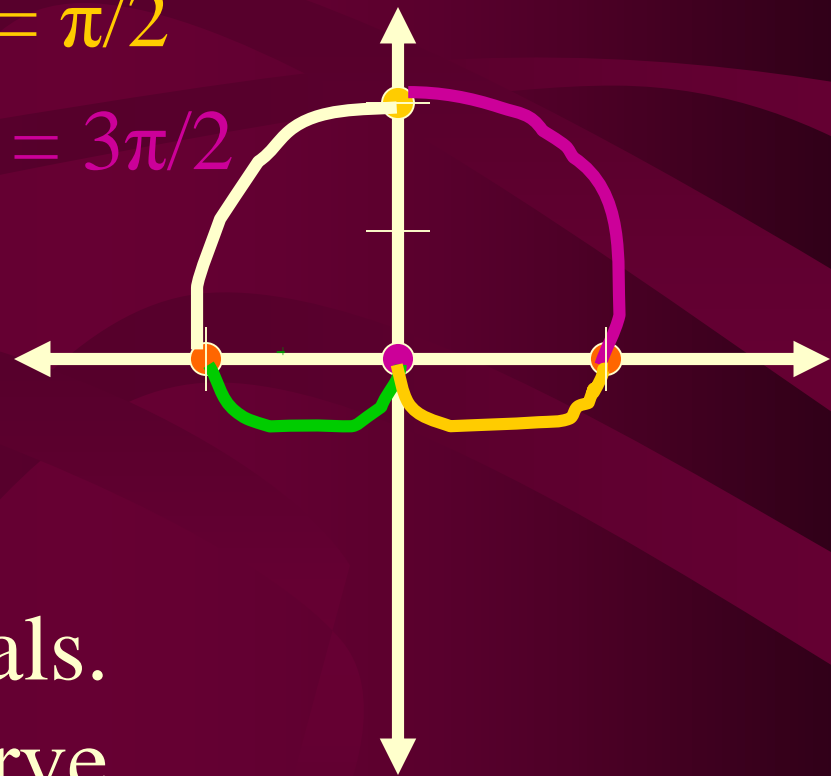
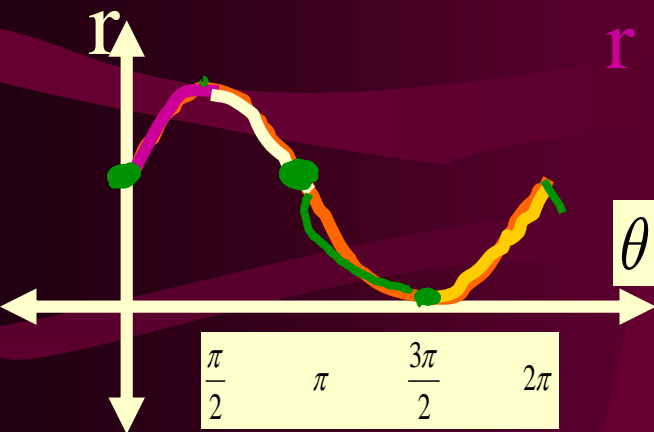
$$r = 1 + \sin \theta$$

First, find the easy points.

Like, when is $r = 1$ $\theta = 0, \pi$

$$r = 2 \quad \theta = \pi/2$$

$$r = 0 \quad \theta = 3\pi/2$$

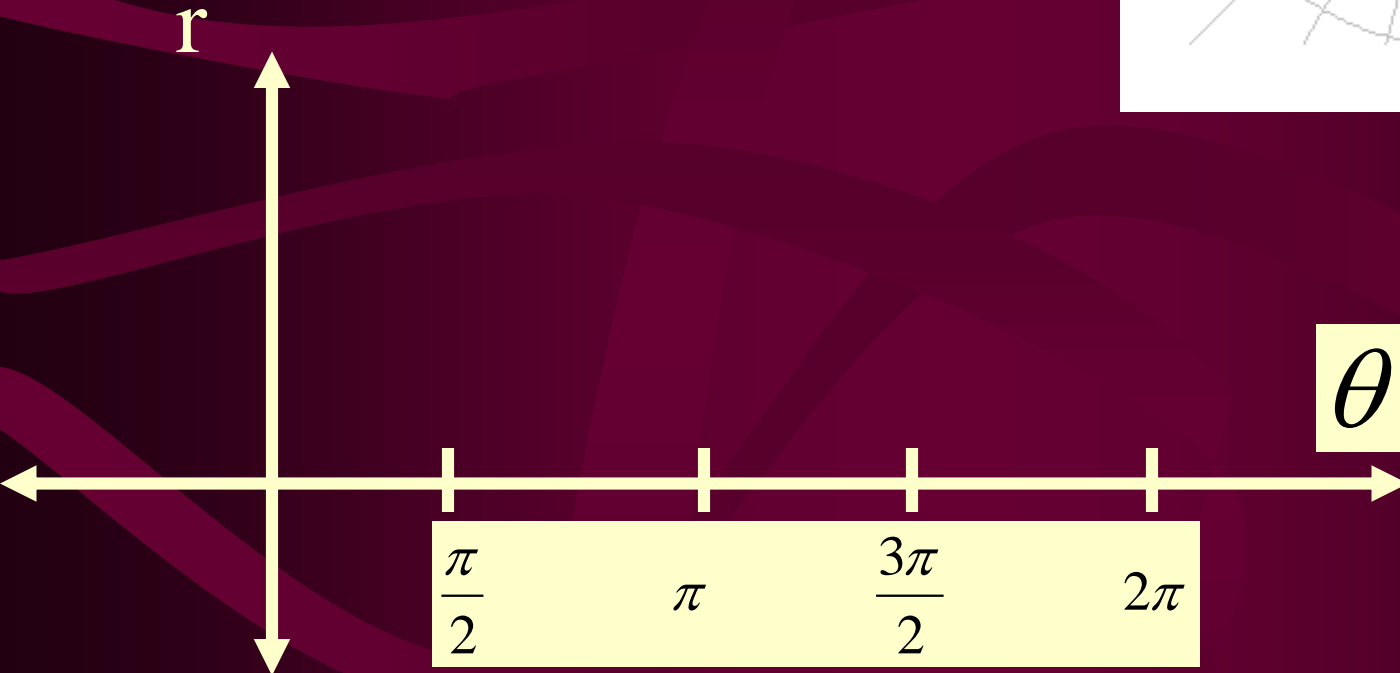
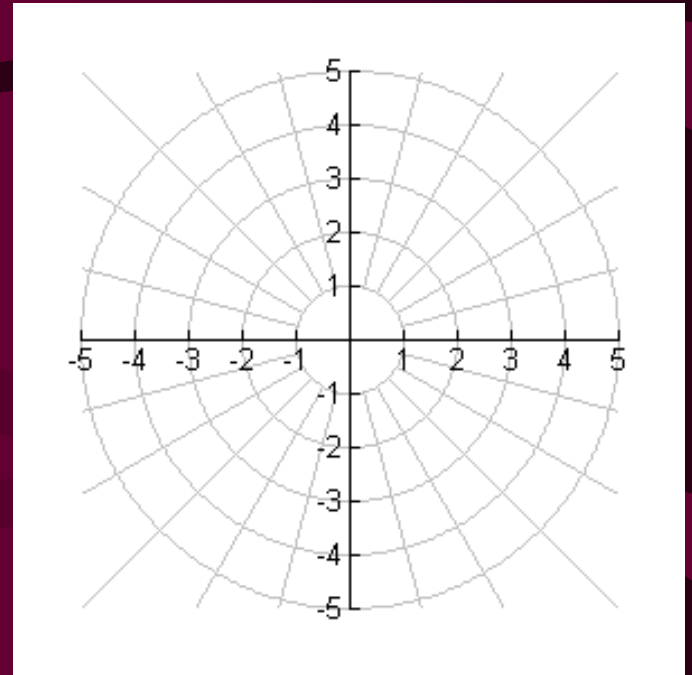


Now, look at intervals.

This is a smooth curve...

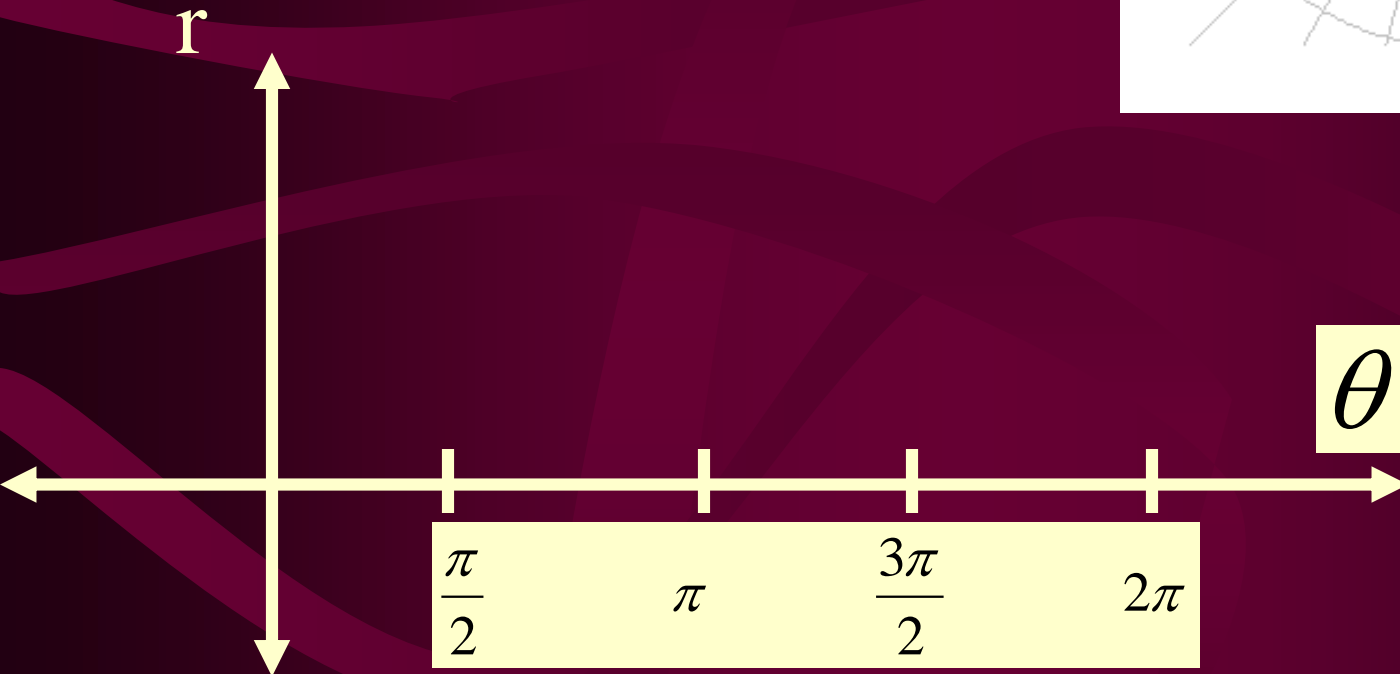
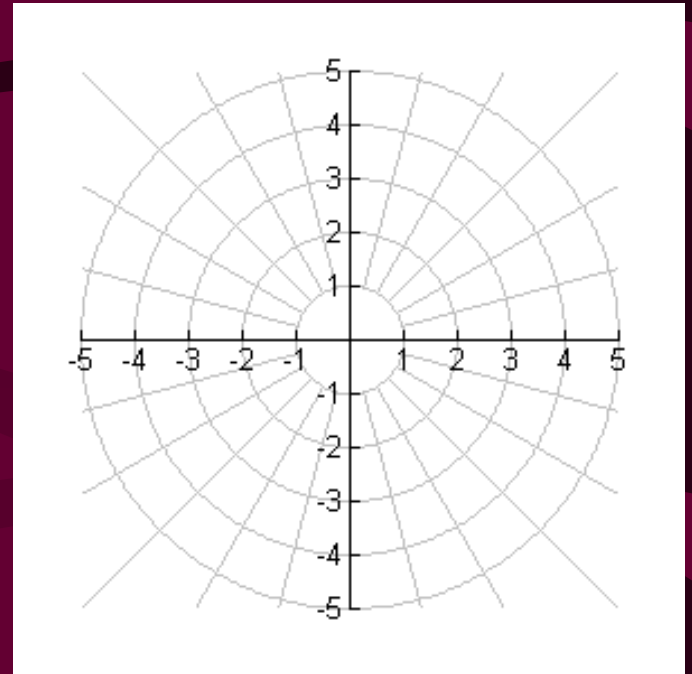
Let's try another...

$$r = 3 \sin(3\theta)$$



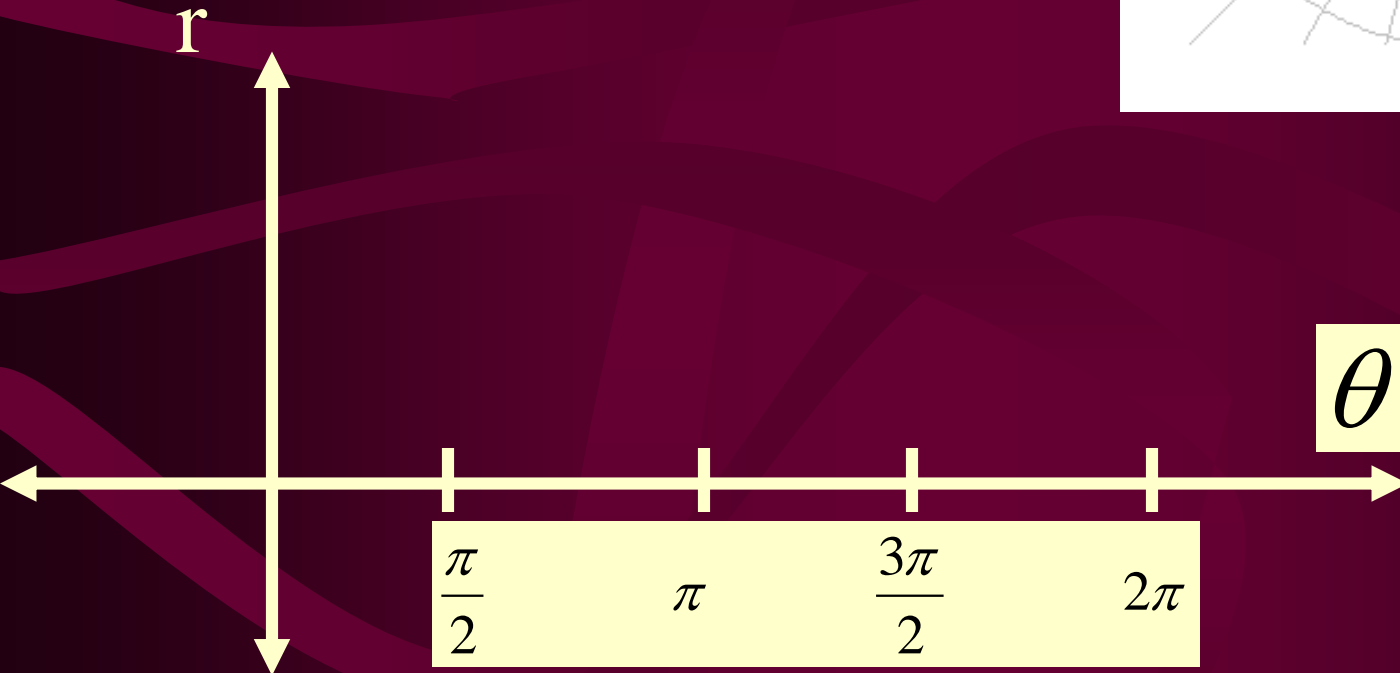
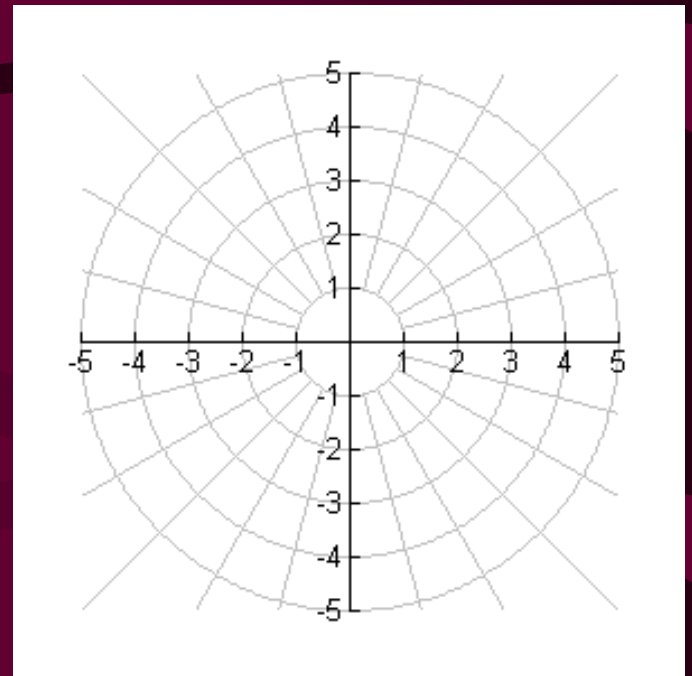
Let's try another...

$$r = 2 + 3 \sin(2\theta)$$



Let's try another...

$$r = \cos \theta$$



Last one...you try it

$$r = 2 - 3\cos \theta$$

