Video from last Thursday over 6.6 and 6.7

https://harryzaims.com/122/122-spring-21/ZOOM-Recordings/210415.mp4

Notes from last Thursday:

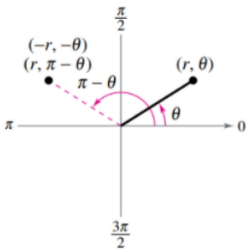
https://harryzaims.com/122/122-spring-21/notes/210415-6-6-and-6-7.pdf

Section 6.9 videos are lagging. Will work on them, this week.

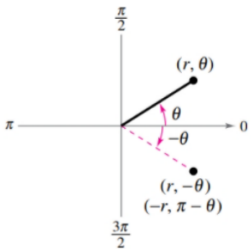
Brayden asks:

Could you go over 6.9 questions 5, 18, 19, 20, 21, 23, 24

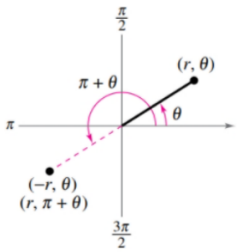
I'll come loaded
for brav on Thursday.



Symmetry with Respect to the Line $\theta = \frac{\pi}{2}$



Symmetry with Respect to the Polar Axis



Symmetry with Respect to the Pole

Tests for Symmetry in Polar Coordinates

The graph of a polar equation is symmetric with respect to the following when the given substitution yields an equivalent equation.

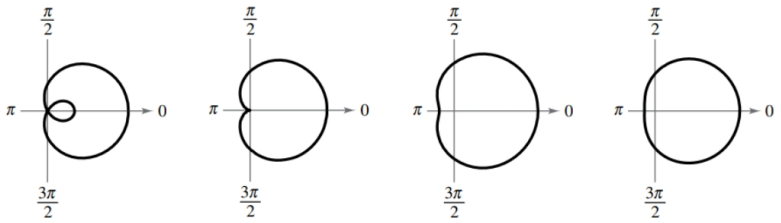
1. The line $\theta = \pi/2$: Replace (r, θ) with $(r, \pi - \theta)$ or $(-r, -\theta)$.
2. The polar axis: Replace (r, θ) with $(r, -\theta)$ or $(-r, \pi - \theta)$.
3. The pole: Replace (r, θ) with $(r, \pi + \theta)$ or $(-r, \theta)$.

Quick Tests for Symmetry in Polar Coordinates

1. The graph of $r = f(\sin\theta)$ is symmetric with respect to the line $\theta = \dfrac{\pi}{2}$.
2. The graph of $r = g(\cos\theta)$ is symmetric with respect to the polar axis.

Limaçons

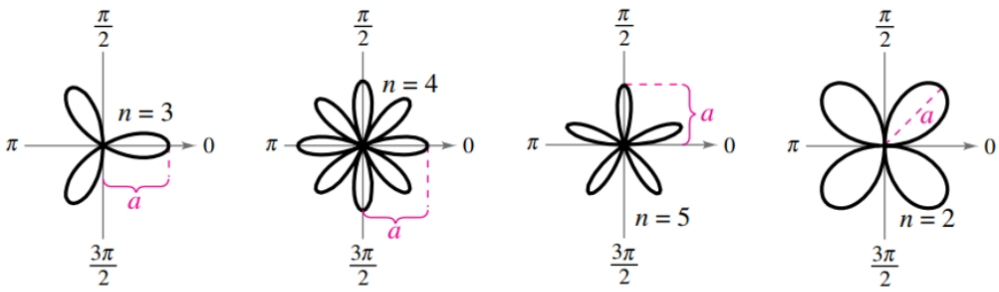
$r = a \pm b\cos\theta,\ r = a \pm b\sin\theta \quad (a > 0, b > 0)$



$\frac{a}{b} < 1$	$\frac{a}{b} = 1$	$1 < \frac{a}{b} < 2$	$\frac{a}{b} \geq 2$
Limaçon with inner loop	Cardioid (heart-shaped)	Dimpled limaçon	Convex limaçon

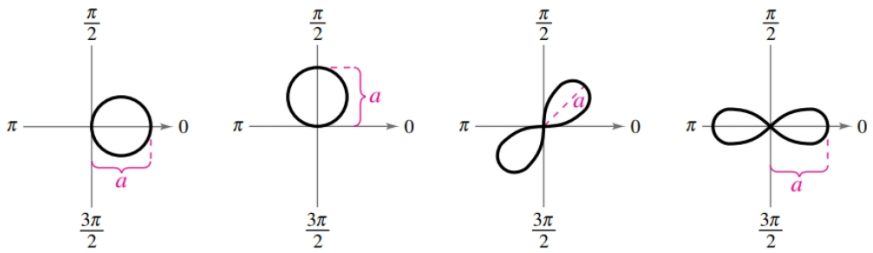
Rose Curves

n petals when n is odd, $2n$ petals when n is even $\quad (n \geq 2)$



$r = a \cos n\theta$ $\quad$ $r = a \cos n\theta$ $\quad$ $r = a \sin n\theta$ $\quad$ $r = a \sin n\theta$

Circles and Lemniscates



$r = a\cos\theta$	$r = a\sin\theta$	$r^2 = a^2\sin 2\theta$	$r^2 = a^2\cos 2\theta$
Circle	Circle	Lemniscate	Lemniscate

19. 0/1 points

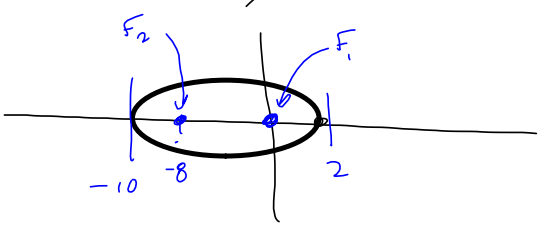
Find a polar equation of the indicated conic in terms of r wi

Conic	*Eccentricity*	*Directrix*
Hyperbola	$e = 4$	$x = 1$

$$r = \frac{4}{4\cos(\theta) + 1} = \frac{ep}{1 + e\cos\theta}$$

$e = 4 > 1 \Rightarrow$ Hyperbola

$(2, 0)$, $(10, \pi)$



Let teacher bone up on §6.9 for next time.

You're ahead of schedule & I need to pave the way in 6.9, later.