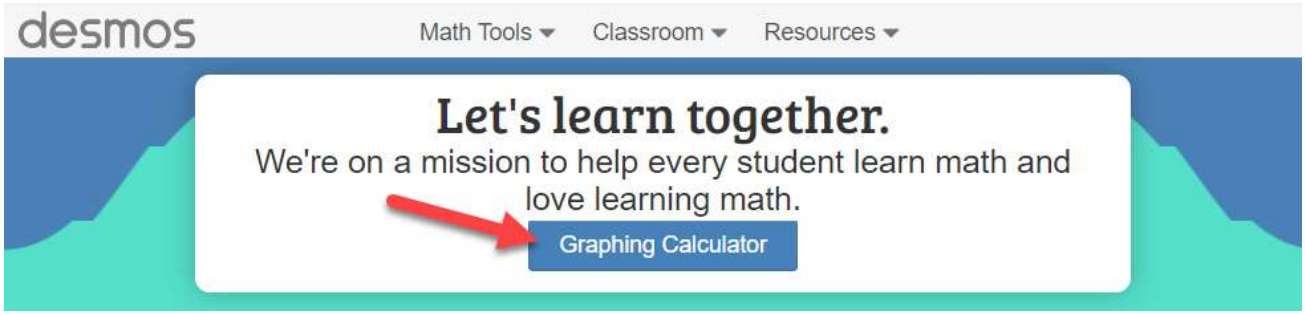
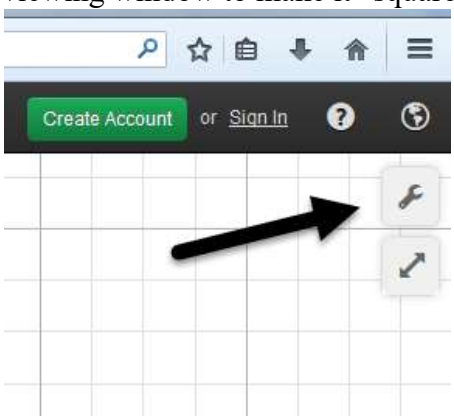
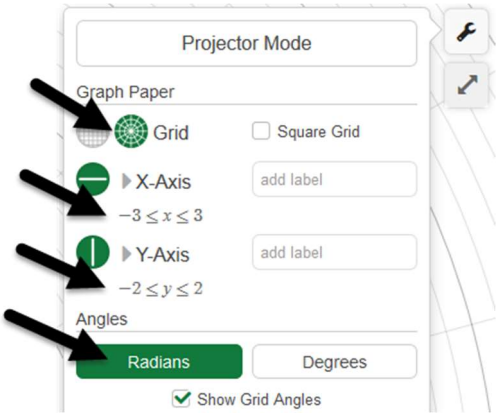
→Go to **desmos.com** and click on Graphing Calculator:

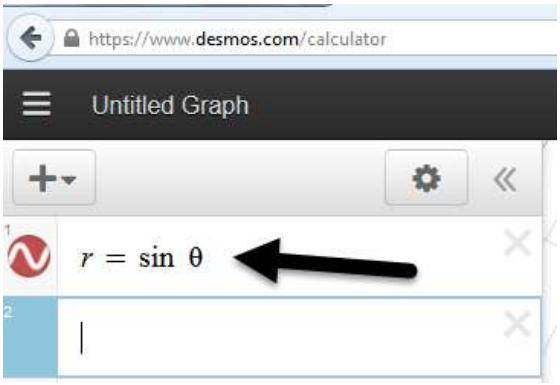


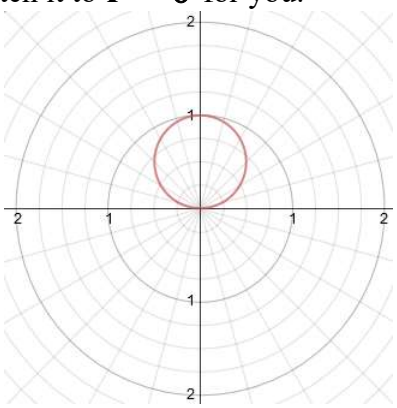
→Click on **tool icon** in upper right corner, then choose options for **Circular Grid** and **Radians**.
Be sure to size your graph window by adjusting the x-axis and y-axis to a ratio of 3:2 and/or adjust the viewing window to make it "square" so graphs aren't distorted. You can also zoom in and out.





→You are ready to type in your equations! To get the Theta symbol, you must type in **r = theta** and the calculator will automatically switch it to **r = θ** for you.





TI-83+ and TI-84+ calculators:

*Set **Mode** to ***Pol*** (polar graphing)

*Select ***Radians***

*Create "square" window by using a **3:2 ratio** for x and y (so graphs aren't distorted)

* Adjust window as needed and/or select **ZOOM**, option **ZoomFit**

Spiral will need multiple rotations so ADJUST θ MAXIMUM to 6π or higher.

*Window for all graphs except for a spiral:

θ min 0	X min -3	Y min -2
max 2π	max 3	max 2
step π/24	scale 1	scale 1
≈.1308996		

step = how often points are plotted between 0 and 2π

OR any 3:2 ratio x = 3, 6, 9, 12,…
y = 2, 4, 6, 8,…

Classifying polar graphs based on the given trig function and values of a and b:

SOME COMMON POLAR CURVES

Circles and Spiral

$r = a$ circle | $r = a \sin\theta$ circle | $r = a \cos\theta$ circle | $r = a\theta$ spiral

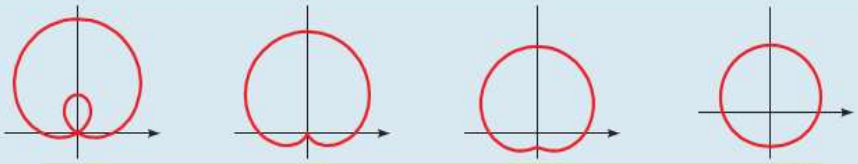
Limaçons , Cardioid

$r = a \pm b \sin\theta$

$r = a \pm b \cos\theta$

$(a > 0, b > 0)$

Orientation depends on the trigonometric function (sine or cosine) and the sign of b.



$a < b$ limaçon with inner loop | $a = b$ cardioid | $a > b$ dimpled limaçon | $a \quad 2b$ convex limaçon

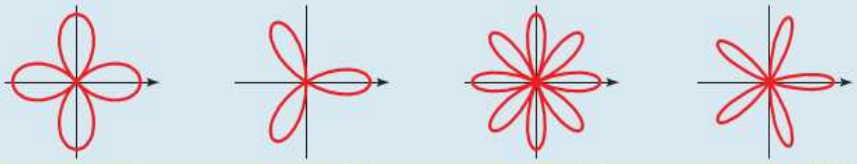
Roses

$r = a \sin n\theta$

$r = a \cos n\theta$

n-leaved if n is odd

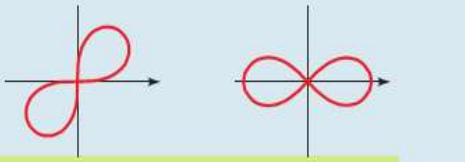
$2n$-leaved if n is even



$r = a \cos 2\theta$ 4-leaved rose | $r = a \cos 3\theta$ 3-leaved rose | $r = a \cos 4\theta$ 8-leaved rose | $r = a \cos 5\theta$ 5-leaved rose

Lemniscates

Figure-eight-shaped curves



$r^2 = a^2 \sin 2\theta$ lemniscate | $r^2 = a^2 \cos 2\theta$ lemniscate

8.2 #17-20, 24-34even, 40-44

CHECK EVEN ANSWERS

$y = -\frac{\sqrt{3}}{3}x$

$x^2 + y^2 = 1$

cardioid

cardioid

circle

lemniscate

limacon

rose

rose

rose

spiral

HINT: #20

Since $\theta = \frac{5\pi}{6}$, it follows that $\tan\frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$

Therefore, $\tan\theta = -\frac{\sqrt{3}}{3}$

Now substitute $\frac{y}{x}$ for tanθ,

to get $\frac{y}{x} = -\frac{\sqrt{3}}{3}$

then rewrite in y = form

OR draw a triangle in Quad II since $\theta = \frac{5\pi}{6}$

Label values for x and y using a special triangle and find the slope using $\frac{\text{rise}}{\text{run}}$ or $\frac{y}{x}$.

Use y = mx + b to write an equation.