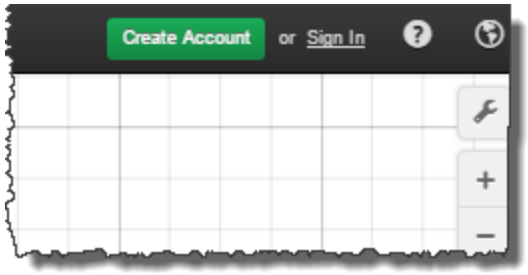
# Desmos--The basics

## Basic Grapher




**Step 1.** Go to: https://www.desmos.com/

**Step 2.** Create an account --it's free--(allows you to save your graphs)

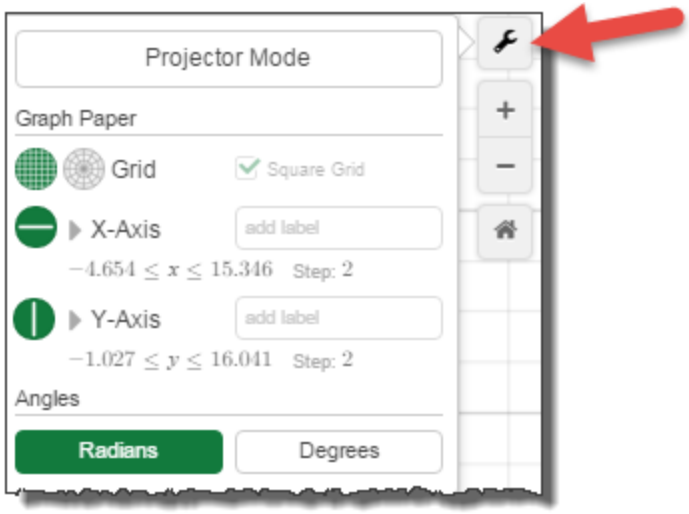

**Step 3.** Create your first graph. A. Try **y = 3x -1**

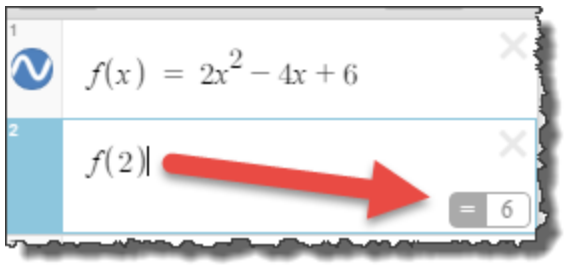
B. y > 3x - 1 C. y >=3x - 1

D. y = 2x^2 - 4x + 6

E. y = x/3 + x/6 F. 3x + 2y = 6

**Step 4.** Play with some of the settings.

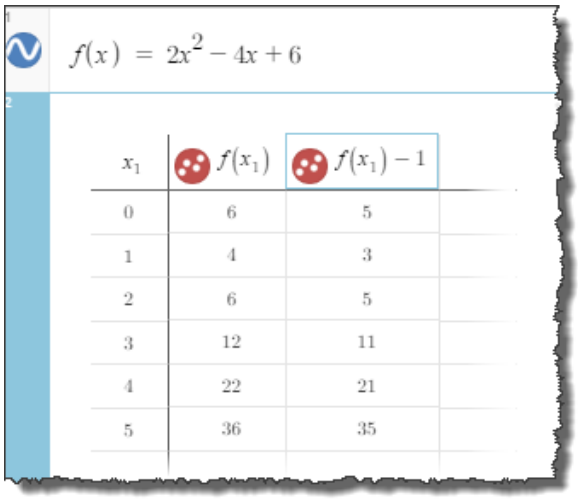


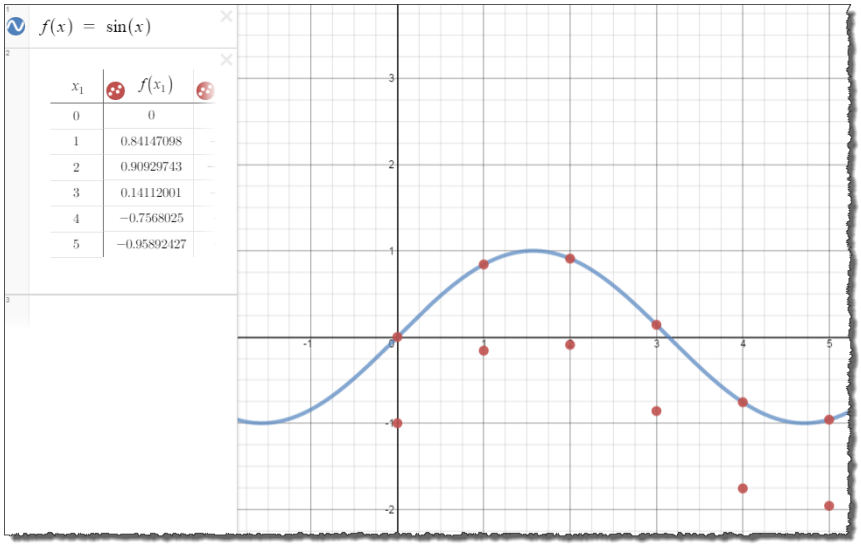




**Step 5.** Use the function notation. A. Try f(x) = 2x^2 - 4x + 6. Now we can evaluate the function. **Try f(2).**

**Step 6.** Now create a table.

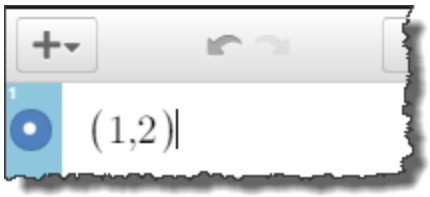
You can create transformations as well. The points will appear on the graph. You can also now change that function to something else and the table and graph are automatically updated to reflect the new function.



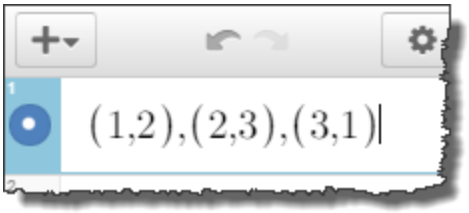




# Plotting Points

**Step 1.** To plot the point (1, 2) just type it in:




**Step 2.** We can type in multiple points by separating them with a comma.

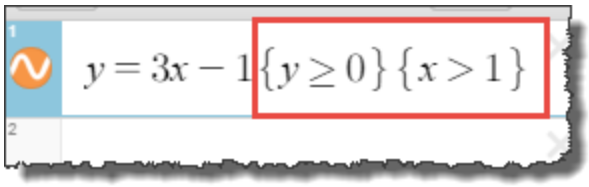


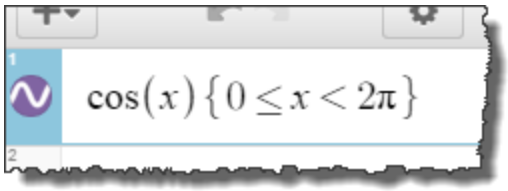

**Step 3.** Not really nice to look at. Convert these points to a table.

**Step 4.** You can also create a moveable point by typing (a,b). Try it!

# Restricting the Domain and Range

To restrict the domain and range simply type the restriction in using the curly braces.

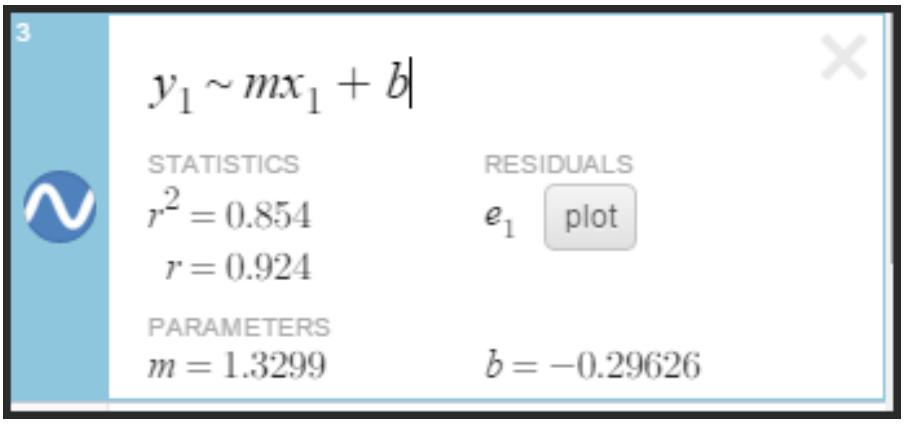



# Regression

**Step 1**. Put the data in the table or copy and paste from a spreadsheet like Excel. Then type in y1~mx1+b.

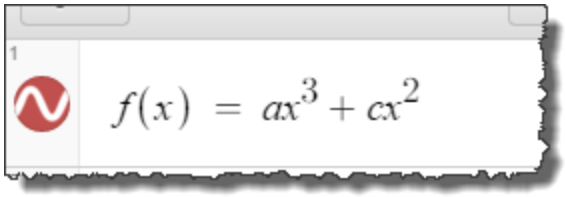
| $x_1$ | $y_1$ |
|---|---|
| 1 | 1 |
| 2 | 3 |
| 3 | 2 |
| 4 | 6 |
| 5.06 | 7.23 |
| 6 | 7 |




**Step 2.** You will see the plot and the regression line. You can also plot the residuals.

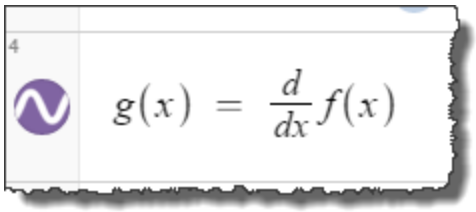
# Calculus-The Derivative

**Step 1.** To graph the derivative of a function, first define the function. We will define it here with sliders.

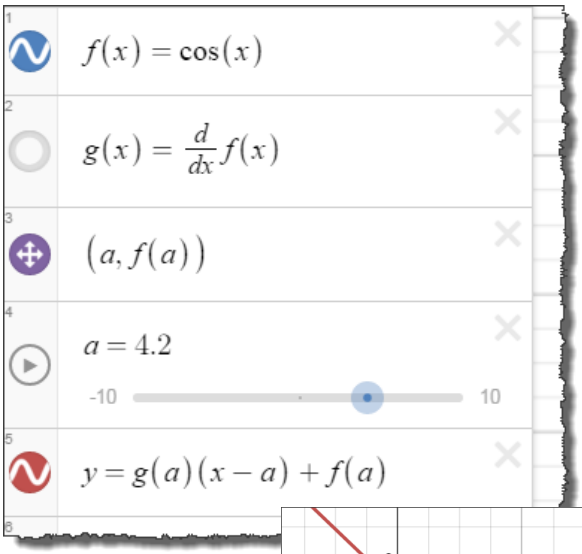


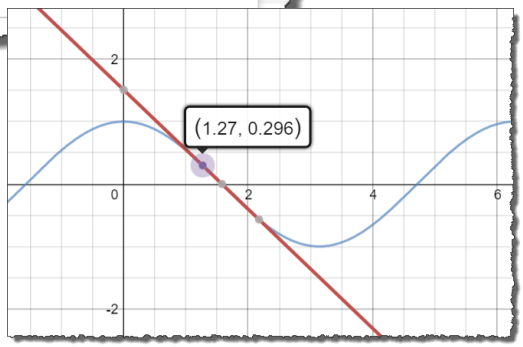


**Step 2**. Define a 2nd function, g(x), as the derivative of f(x). Play with the sliders and investigate the effect on the derivative.

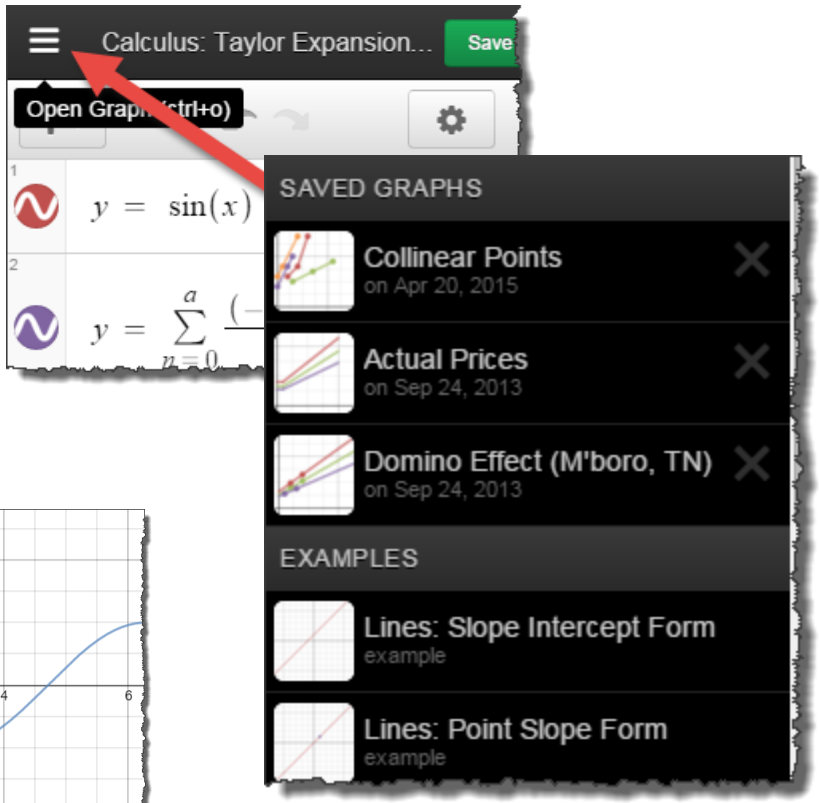



## Tangent Line



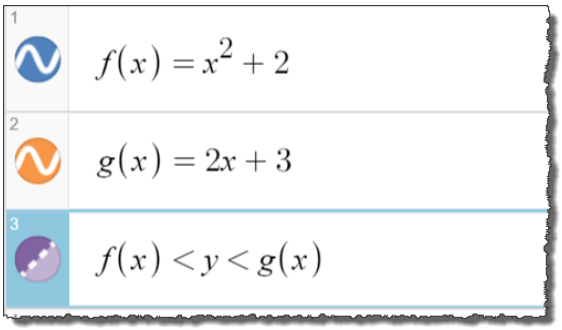



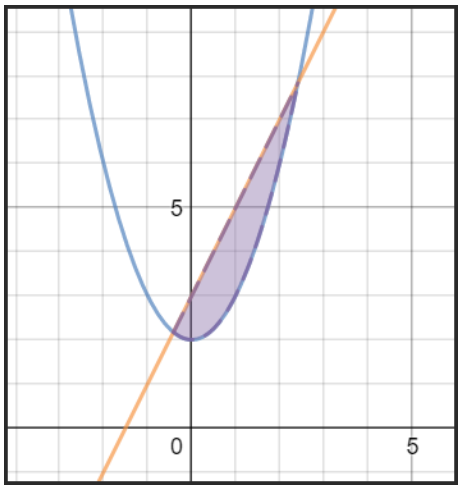

## Other functions & saved graphs



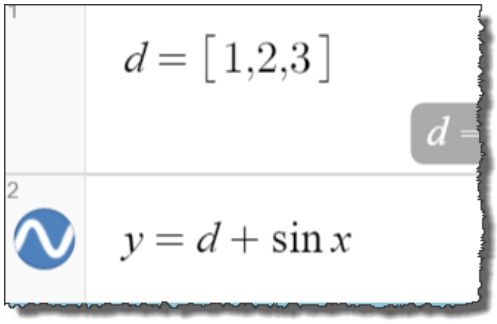
# Misc (May not hand out)

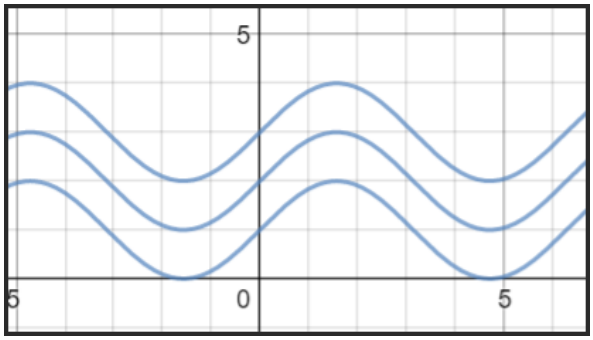
## Inequalities



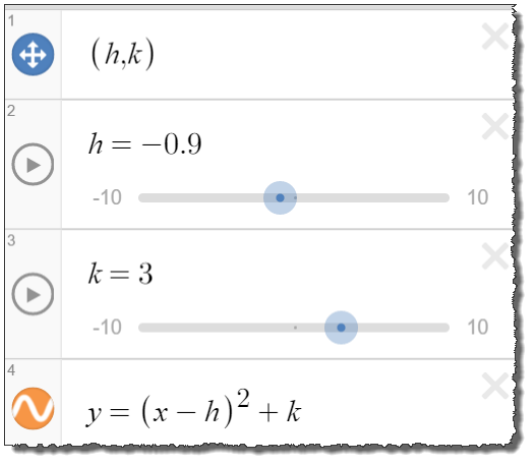



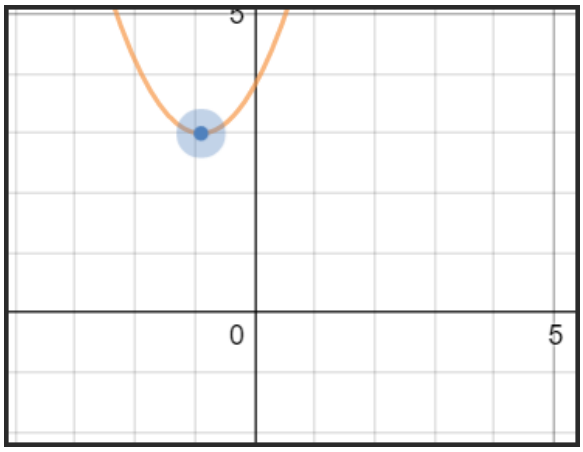

## Lists



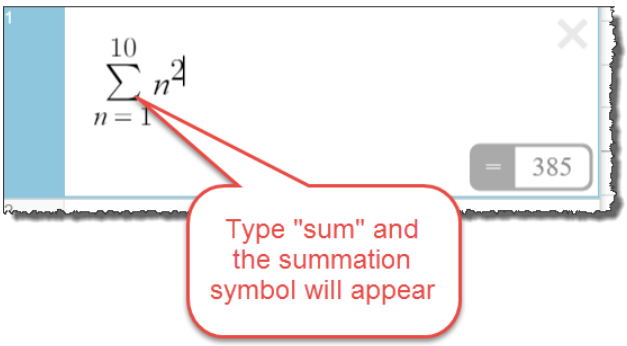
## Moveable points



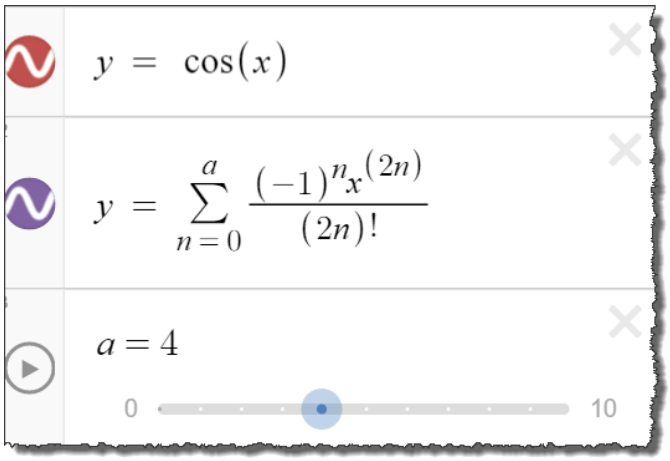



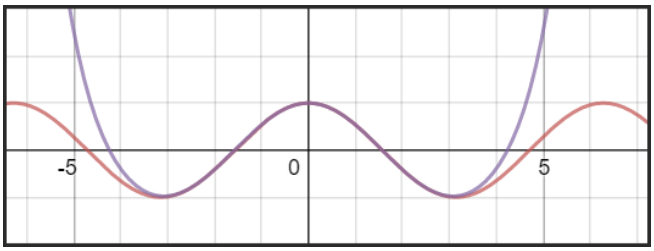

## Summation

### Basic summation



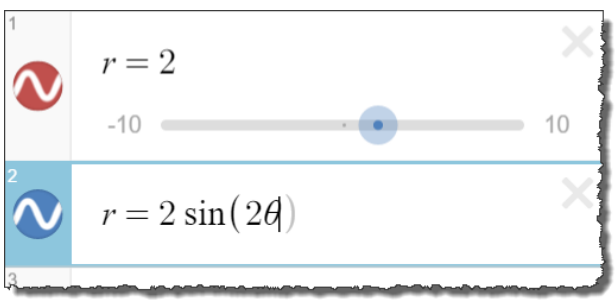

### Taylor Series Expansion

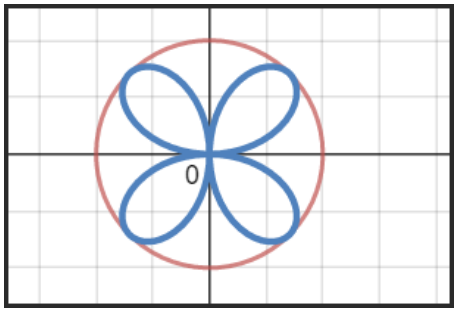


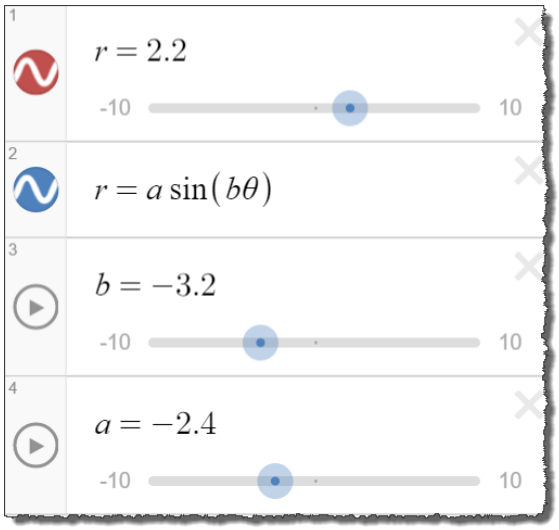
**Polar Coordinates**

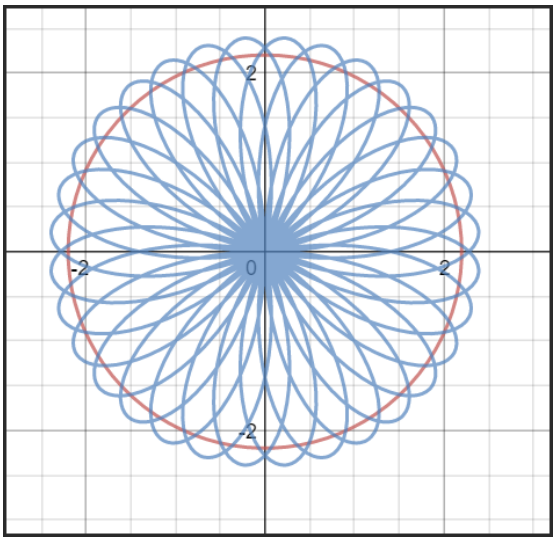
**Desmos automatically interprets the equations with r and theta as polar.**



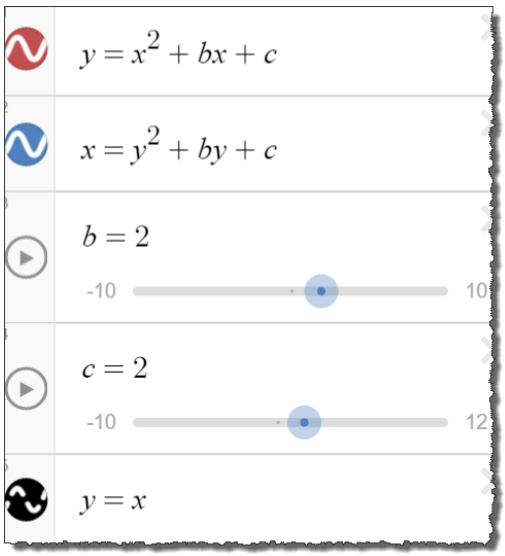



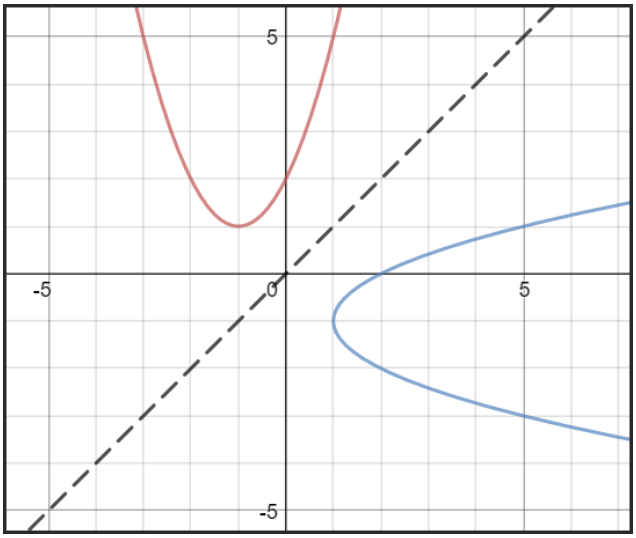

**Creating sliders**



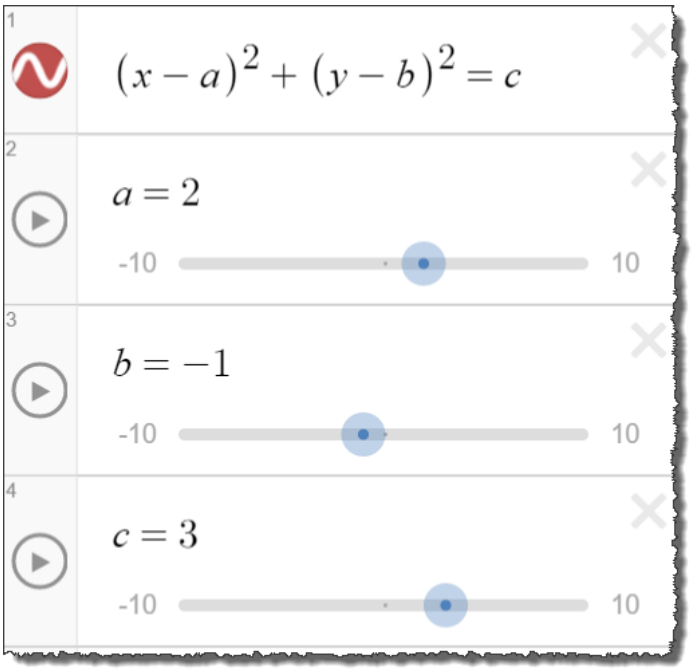



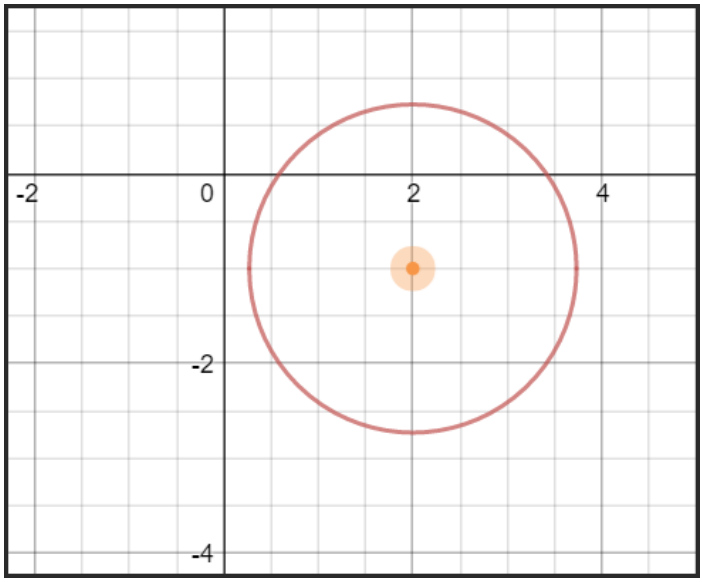

**Inverse**

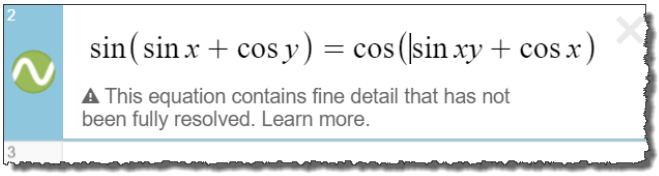


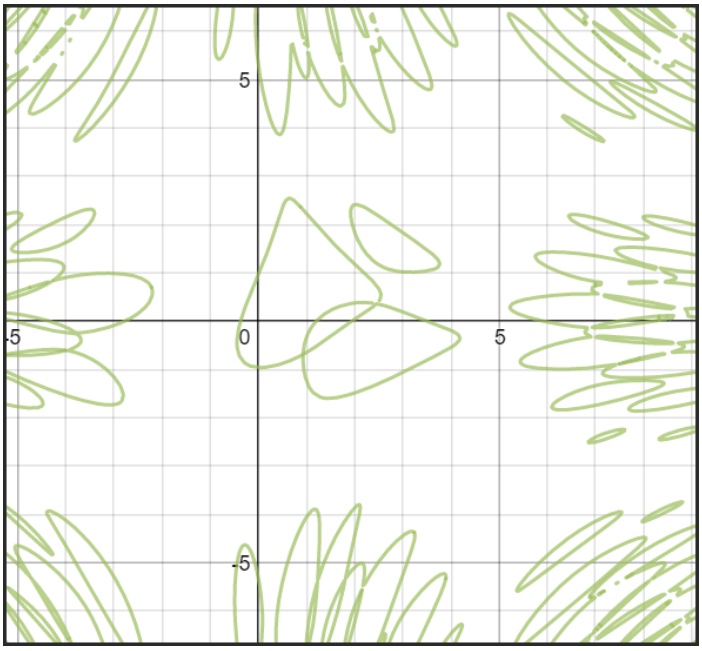



**Implicit Relations**



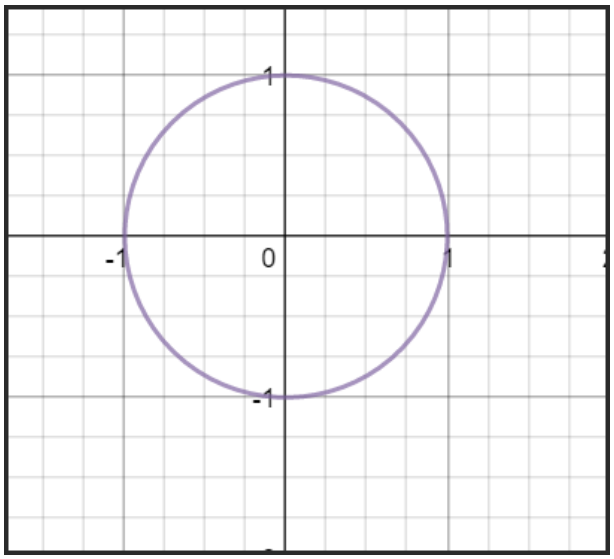



**Parametric Equations**

1

$(\cos 2t, \sin 2t)$

domain: $0 \le t \le 3.14$




Cardioid

2

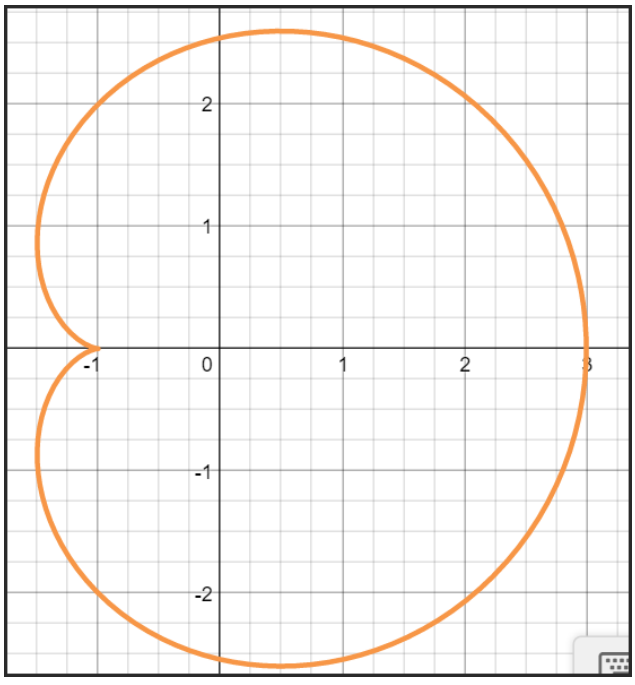
$(a(2\cos t - \cos(2t)), a(2\sin t - \sin 2t))$

domain: $0 \le t \le 6.28$

3

$a = -1$

-10 10




**Exploring Trig Identities**

1

$\sin^2 x + \cos^2 x$

| | |
|---|---|
| −2 | 1 |
| −1 | 1 |
| 0 | 1 |
| 1 | 1 |
| 2 | 1 |