

## Desmos Activity: Drawing Lines

If you don't already have the iPad app, "Desmos", go to the App Store and install it. It's free!

(Desmos can also be used in a web browser if you go to [www.desmos.com](http://www.desmos.com). The website allows you to save and share graphs, but, the app has better performance.)

Each time you complete a drawing, call Mr. Stonebraker over to show him so he can mark your paper. At the end of class, turn this paper in!

### ***Adjusting the y-intercept***

***Done? [ ]***

1. In the first box, type "(3,6)" to make a point appear at those coordinates.
2. In the next box, type "m=4" to set the slope for a line.
3. In the next box, type "f(x)=mx+b" to make a line.
4. Desmos will ask if you want to make a slider for the y-intercept by bringing up a button that says "b". Hit it!
5. Use the slider to adjust your y-intercept until the line passes through your marked point.

### ***Adjusting the slope***

***Done? [ ]***

1. Clear all your entry boxes by touching the "x" in their corners.
2. In the first box, type "b=-20" to set the y-intercept.
3. In the next box, type "(83,9)" to make a point appear at those coordinates.
  - NOTE: You will probably need to zoom out to see this point!!
4. In the next box, type "f(x)=mx+b" to make a line.
5. Hit the "m" button to make a slider for the slope. BUT, when you play with this slider, you'll find that the slider's "steps" are too big and skip right over your point! You have two choices:
  - You can tap the number value for m to *type in values* and try to get it that way. OR...
  - You can touch the gear icon to adjust the options for your slider. You can set the endpoints and the step size here to make it easier to find the number you want.
6. Adjust the slope to get the line through your point!

### ***Adjusting both!!***

***Done? [ ]***

1. Clear all your entry boxes by touching the "x" in their corners.
2. In the first two boxes, type "(-2,1)" and "(5,0)" to make two points appear.
3. In the next box, type "f(x)=mx+b" to make a line.
4. Desmos will ask if you want sliders for m and b. Touch "all" to make them both.
5. Adjust the sliders until your line goes through BOTH of the points you marked. If you need to type in some guessed values or change the slider options, do so!

***Turn over for more interesting challenges!***

### ***Make a square***

***Done? [ ]***

1. Clear all your entry boxes.
2. Make two horizontal lines by entering “ $y=0$ ” in two boxes.
3. Make two vertical lines by entering “ $x=0$ ” in two boxes.
4. Use the sliders to arrange the lines into a square with one corner at (3,5) and side lengths of 4.

### ***Make a right triangle***

***Done? [ ]***

1. Clear all your entry boxes.
2. Make one horizontal line and one vertical line.
3. Make an adjustable line by entering “ $y=mx+b$ ” and turning on sliders for  $m$  and  $b$ .
4. Arrange the lines into a right triangle with the right angle occurring at (-2, 4), and legs of length 7 and 10.

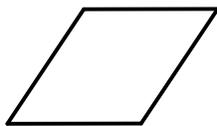
### ***Make an equilateral triangle***

***Done? [ ]***

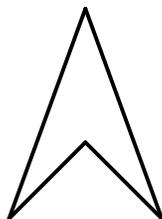
1. Clear all your entry boxes.
2. Make one horizontal line.
3. Make TWO diagonal lines by entering “ $y=ax+b$ ” and “ $y=cx+d$ ”. Turn on sliders for all four.
4. Adjust your lines until you have an equilateral triangle with its bottom-left corner at (1,-1). It will be hard to get this exact, so make it as close as you can!
  - NOTE: If you're clever, you can figure out ways to make a perfect equilateral triangle by positioning points carefully and re-using some of the letters in more than one formula...

### ***Other shapes***

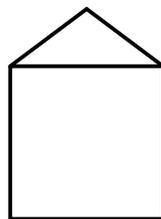
Duplicate these figures as closely as you can! They each require 4-6 lines.



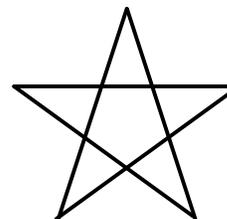
***Done? [ ]***



***Done? [ ]***



***Done? [ ]***



***Done? [ ]***

### ***Tip: Domain/range restrictions***

If you want to restrict the  $x$  or  $y$  values for one of your entry boxes, you can put an inequality in curly braces after the expression. For example:

$$y=11x-4\{3<x<8\}$$

This would graph the line only for  $x$  values between 3 and 8. You can make your drawings prettier by cutting off the ends of your lines like that!