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Geogebra Activity for Parallel and Perpendicular Lines

We've done a little practice with Geogebra and calculating slopes of lines, but now we're going to take that idea one step further. Geogebra is a dynamic program and has a great feature called a *slider*, which allows us to change variables and move graphs simultaneously. Today you will create a *slider* and use it to determine one very important characteristic of parallel and perpendicular lines.

First some vocabulary:

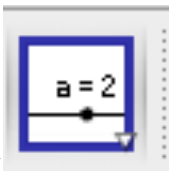
Parallel = _____

Perpendicular = _____

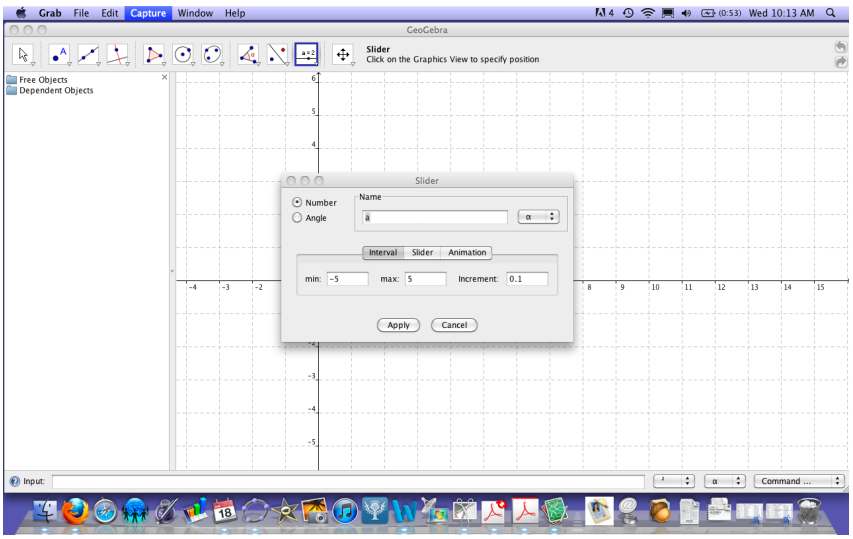
"m" is the _____

"b" is the _____

Before we begin, make sure that you turn the coordinate grid on by clicking on VIEW and then GRID



You'll notice that on the toolbar there is an icon that looks like this → That is your *slider* icon. Click on it and then click somewhere on you coordinate plane. You get a pop-up that looks like this:



This allows you to input information for your *slider*.

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Our *slider* will be the value of our slope, so let's use the letter _____ for our name and keep the intervals and increment the same as the default. Click APPLY.

We should orient our *slider* so that it's vertical. Click on the  and double click on your new *slider* to bring up the OBJECT PROPERTIES. Change the *slider* to VERTICAL and click CLOSE.

In the INPUT field down at the bottom of the screen enter: y=m_x+1 and hit RETURN/ENTER. **Notice the space between the "m" and the "x"**. Move the *slider* up and down and notice what happens. Also note the equation of the line changes in the DEPENDENT OBJECTS column on the left.

Explain what happens to the graph in your own words as you move the slider:

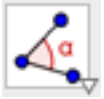
_____

_____

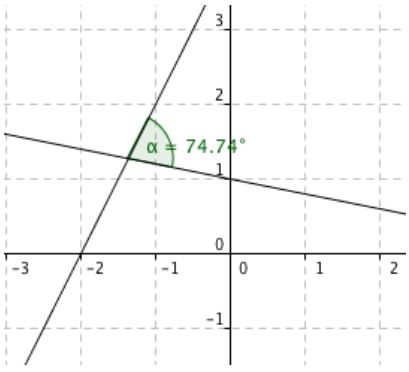
_____

Now enter the equation y=2x+4 into the INPUT field. Both lines should be on the coordinate plane. What is the slope of that line? _____

If **PARALLEL** lines never touch on the same plane then the angle between them should be non-existent or 0^0

Click on the 

icon. This let's us measure the angle between the lines. We measure the angle by clicking on the two lines COUNTERCLOCKWISE. The measure of the angle should look something like this.



Move the slider up and down again and notice what happens to the angle measurement between the lines.

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Move the slider up or down until the angle measurement in the **DEPENDENT OBJECTS** folder becomes 0^0.

What is the value of the *slider/slope* when the two lines are parallel? _____

Change the equation of the FREE OBJECT line by double clicking on it in the left column. Change the equation to y=.5x+4. Now move the *slider* again until the angle measurement between the lines is 0^0.
What is the slope of the original line? _____
What is the value of the *slider/slope*? _____

Try it again for the line with the equation y=-.3x+4 Move the *slider*.
What is the slope of this line? _____
What is the value of the *slider/slope*? _____

What can you say about the slopes of **PARALLEL LINES**?

_____

You know that the word **PERPENDICULAR** means that the two lines form a 90^0 angle, so let's measure the angle created between two lines.

Change the equation of the FREE OBJECT line back to the original y=2x+4
What is the slope of this line as a fraction? _____
Now move the *slider/slope* until the angle measurement between the lines is 90^0.
What is the measure of the slope as a fraction? _____

Change the equation of the FREE OBJECT line to y=.4x+4 What is the measure of the slope of that line as a fraction? _____. Now move the slider up or down until the angle measures 90^0 . What is the measure of the second slope as a fraction? _____

Let's try one more. Change the equation of the FREE OBJECT line to y=.25x+4
What is the slope of that line as a fraction? _____
Move the *slope/slider* until it measures 90^0. What is the slope as a fraction? _____

What can you say about the slopes of **PERPENDICULAR LINES**?

_____
_____

Let's use this knew knowledge about slopes of parallel and perpendicular lines to complete the worksheet on the back of this page.

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Fill in the proper "choice" equation into the appropriate box. Some boxes may not contain an equation.

Equation	Parallel to:	Perpendicular to:	"Choices"
$y = \frac{1}{3}x + 1$			$y = 5x + 7$
$x = 7$			$y = -3$
$y = 2x + 3$			$y = \frac{3}{2}x - 1$
$y = -4x + 3$			$y = \frac{1}{4}x - 3$
$y = 5x - 3$			$y = -3x$
$y = -\frac{2}{3}x + 1$			$y = .4x - 3$
$y = 8$			$2x + 4y = 6$
$y = \frac{2}{5}x + 1$			$y = 4x - 9$
$y = \frac{1}{4}x + 5$			$y = -\frac{1}{5}x - 1$
$y = \frac{3}{2}x - 3$			$y = 1.5x + 3$
			$x = 2$
			$2x + 3y = 1$
			$y = -\frac{5}{2}x$