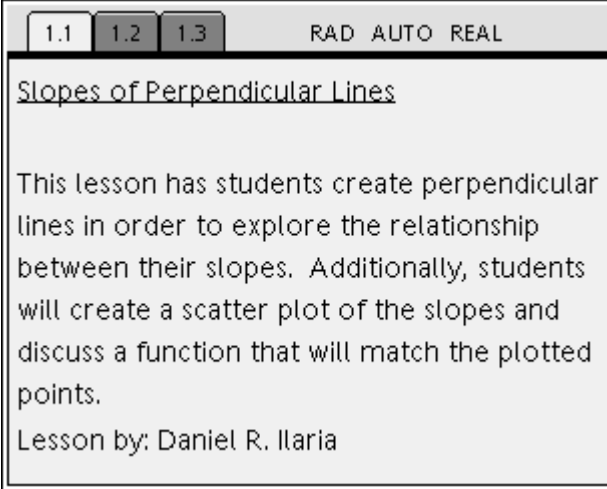
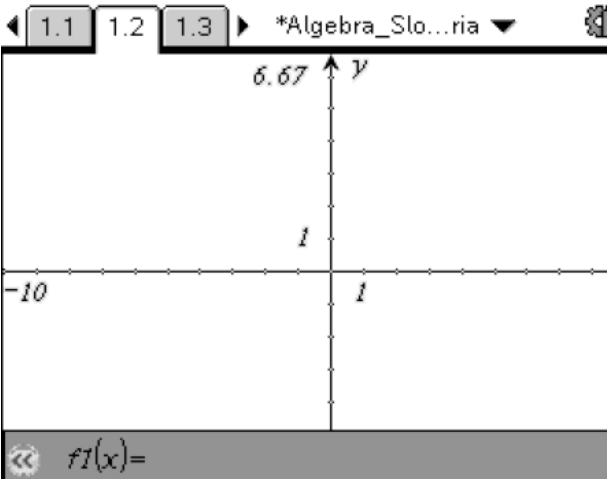

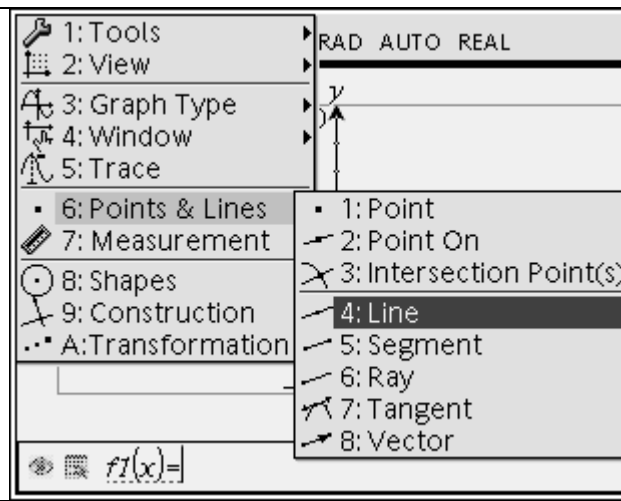



# Slopes of Perpendicular Lines With TI-Nspire™

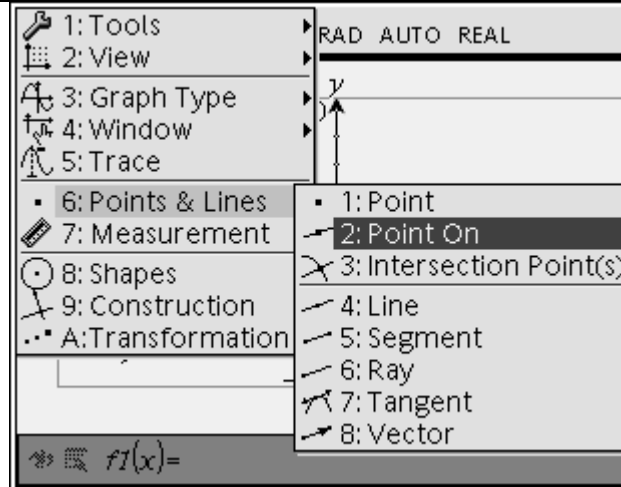
Objective: To determine a relationship between the slopes of perpendicular lines.

<p>1) In this lesson, you will create perpendicular lines in order to explore the relationship between their slopes. Additionally, you will create a scatter plot of the slopes and discuss a function that will match the plotted points.</p> <p>Follow the directions below to create a pair of perpendicular lines in the Graphs &amp; Geometry Application.</p>	 <p>The screenshot shows the TI-Nspire interface with page tabs 1.1, 1.2, and 1.3. The title 'Slopes of Perpendicular Lines' is displayed. Below the title, the lesson description is shown: 'This lesson has students create perpendicular lines in order to explore the relationship between their slopes. Additionally, students will create a scatter plot of the slopes and discuss a function that will match the plotted points.' The author's name 'Lesson by: Daniel R. Ilaria' is at the bottom.</p>
<p>2) Open file: Algebra_SlopesofPerpendicularLines_II aria.</p> <p>Move to page 1.2 by hitting <b>ctrl</b> and <b>1.2</b> .</p>	 <p>The screenshot shows the TI-Nspire interface with page tabs 1.1, 1.2, and 1.3. The title bar shows '*Algebra_Slo...ria'. A coordinate plane is displayed with a vertical line at <math>x = 1</math> and a horizontal line at <math>y = 6.67</math>. The x-axis is labeled with <math>-10</math> and <math>1</math>. The y-axis is labeled with <math>6.67</math> and <math>1</math>. At the bottom, the function editor shows <math>f1(x) =</math>.</p>

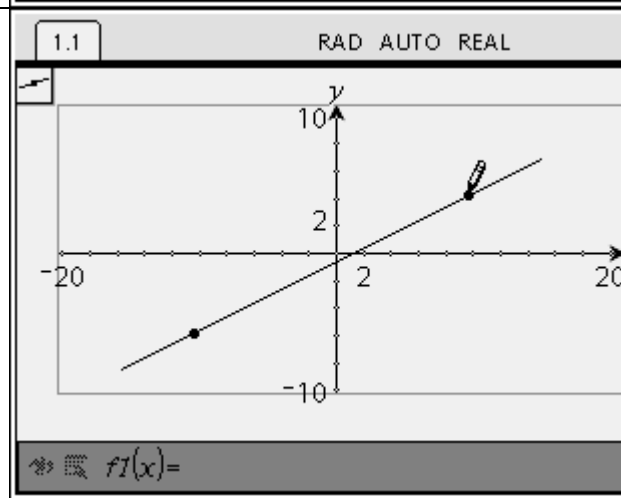
3) Hit , then choose LINE from the POINTS & LINE menu.




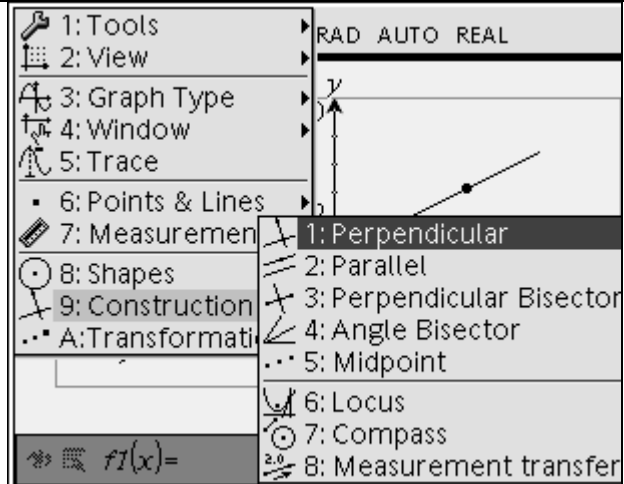
4) Construct a line on the screen. Next, under , select POINT ON from the POINTS & LINE menu






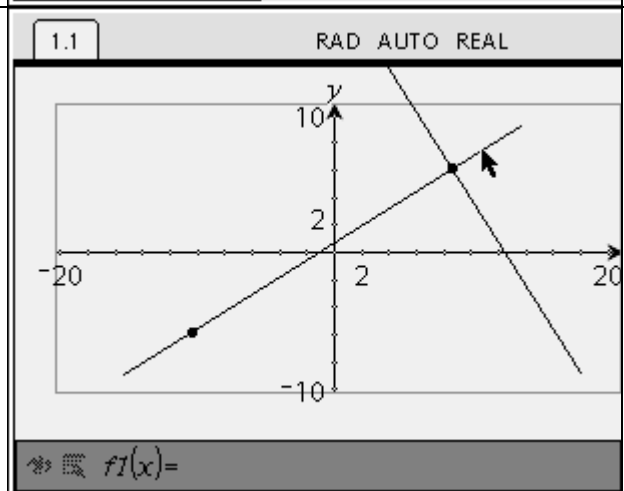
5) Place the point somewhere on the line constructed in step 4.





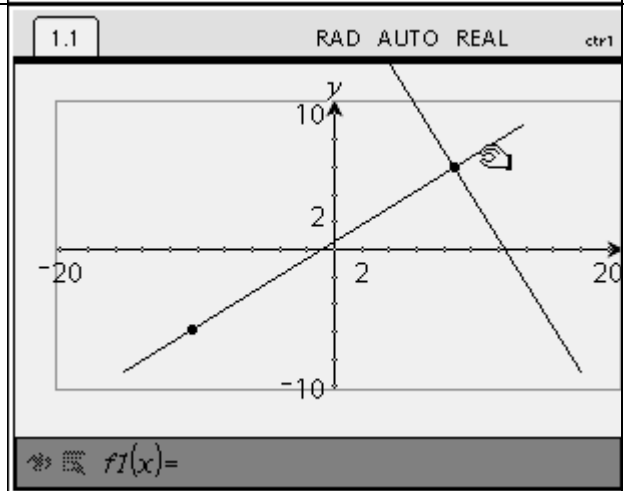
6) Construct a perpendicular line by selecting  then CONSTRUCTION and PERPENDICULAR.





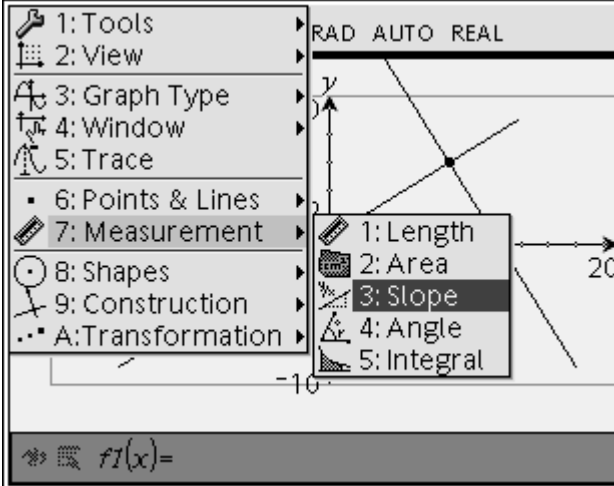
7) Hit . Move the hand over the point created in step 5. Hit . Now move the hand away from the point, but over the line on the screen. Hit  to place the perpendicular line.



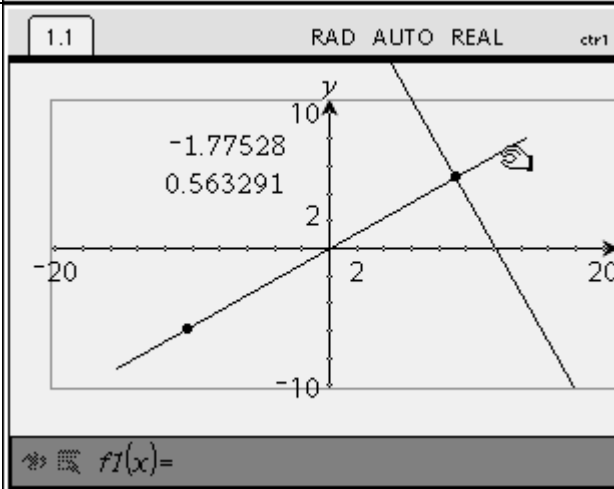
8) Check to make sure both lines move together by using  and  to grab onto the line using the NavPad to move the line.




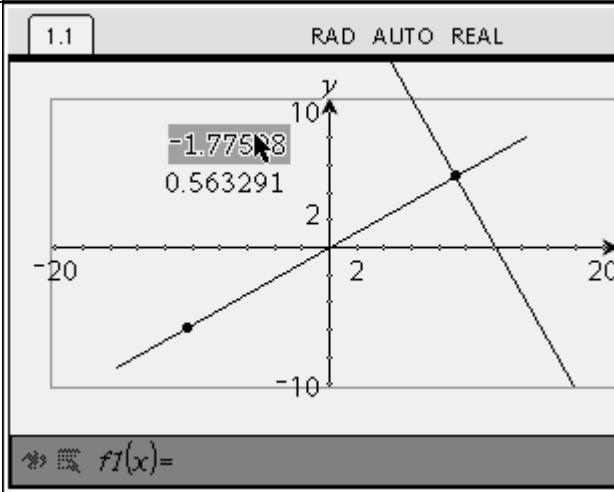
9) Calculate the slope of each line by selecting  then MEASUREMENT and SLOPE. Next, move the hand over each line and select  to select the line and again to place the value. Repeat for the second line.



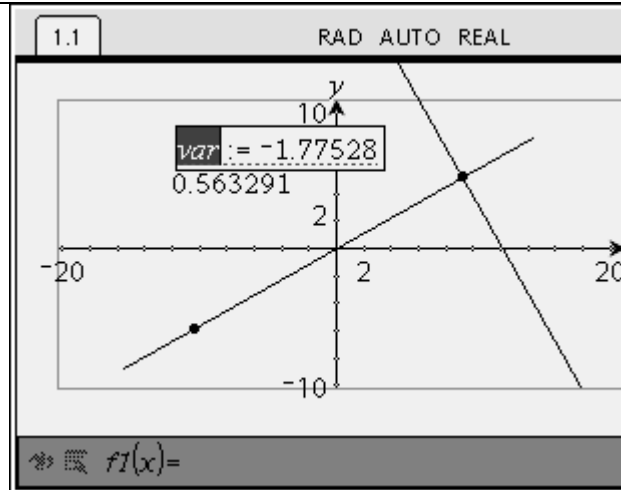
10) Move the lines around and see if you can determine a relationship between the two slope values.



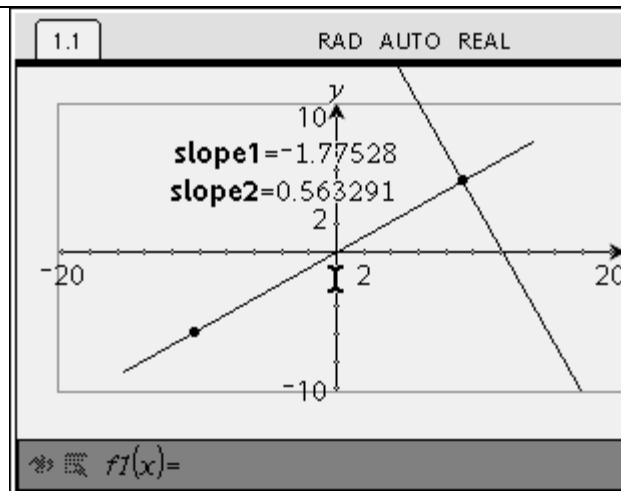
11) Create a variable for each slope by highlighting a slope value using the  button.



12) Hit  $\text{ctrl}$  then  $\text{var}$  and type **slope1** as the variable name. Repeat for the second slope value using the variable name **slope2**.



13) Your screen should be similar to this one.


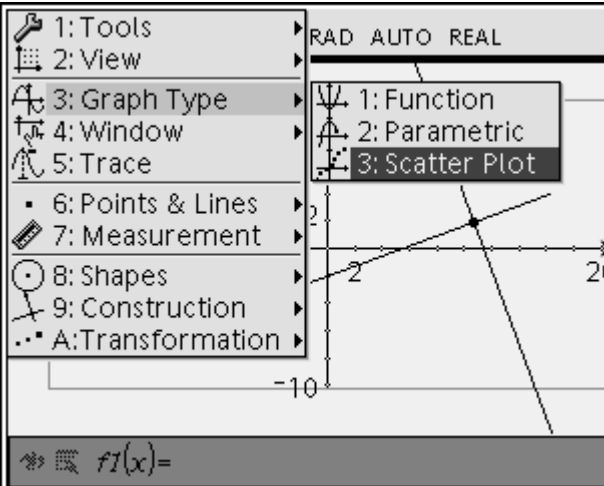

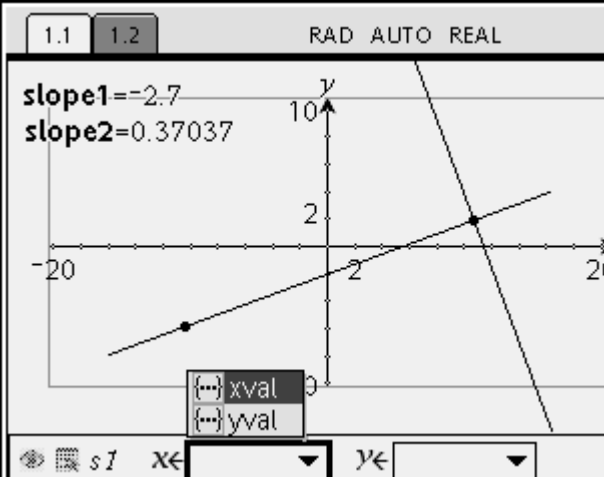


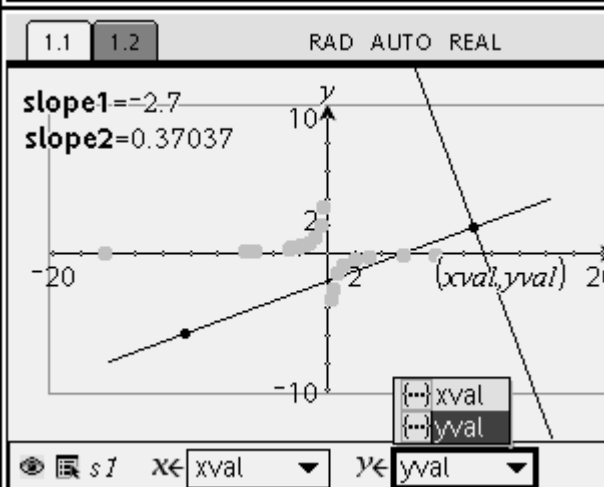


14) Once again, move the pair of perpendicular lines around and see if you can determine a relationship between the two slope values. Go to page 1.3 and examine the lists for help with determining a relationship.

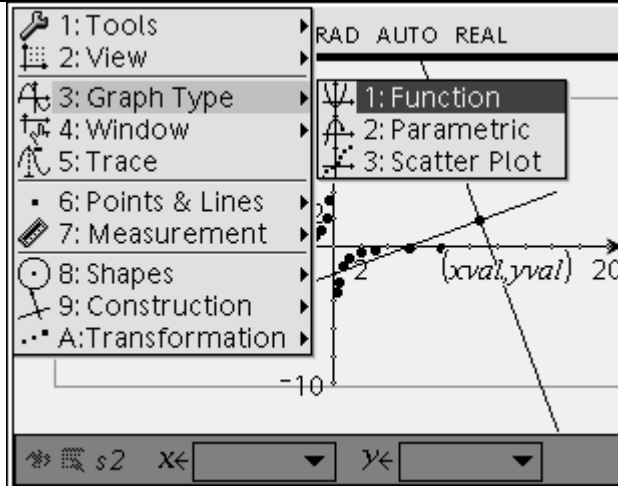
(Sample screen shot on the right)

The calculator screen shows a table with columns A, B, C, and D. Column A is labeled 'xval' and column B is labeled 'yval'. The table contains several rows of numerical data. The bottom of the screen shows the cursor at A1.

	A xval	B yval	C	D
◆	=capture(slope1)	=capture(slope2)		
1	-1.33333	.75		
2	-1.40171	.713415		
3	-1.61538	.619048		
4	-1.8172	.550296		
5	-1.96512	.508876		
6	-2.0110	.497041		

<p>15) In order to create a visual representation of the slope values, we will create a scatter plot to demonstrate the relationship.</p> <p>Select  then GRAPH TYPE and SCATTER PLOT</p>	
<p>16) Hit  and select <i>xval</i></p>	
<p>17)  over to y list and hit  and select <i>yval</i>.</p>	
<p>18) Go back to the graph screen and move the lines around again in order to create more points on the screen</p>	

19) Select  then GRAPH TYPE and FUNCTION



20) In  $f1(x)$ , type a function that goes through all of the points. Discuss how this function describes the relationship between the slopes of perpendicular lines.

