

Slopes of Perpendicular Lines

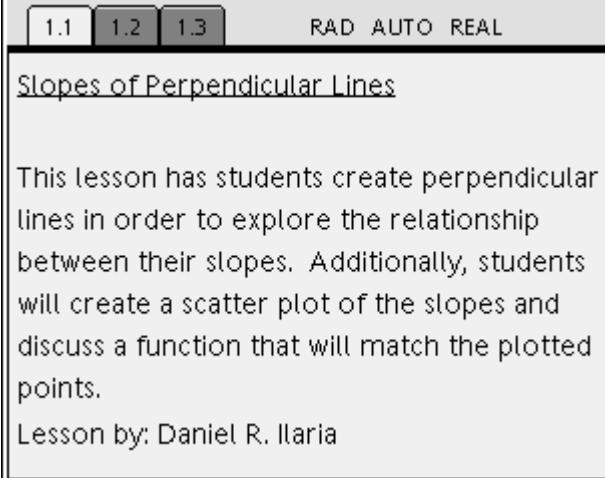


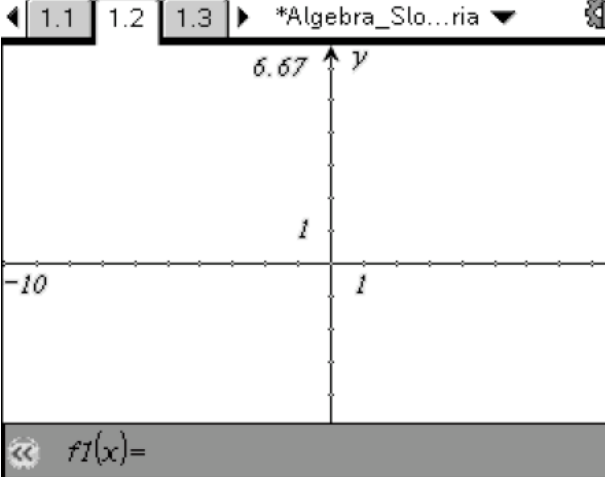
Lesson Plan for TI-Nspire™


Subject: Algebra

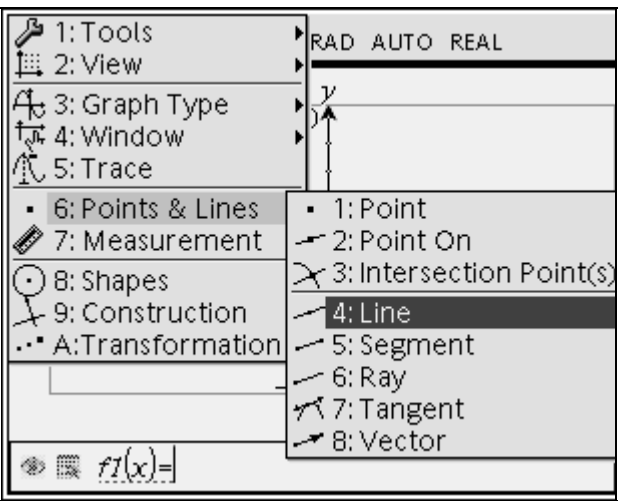
Lesson Time: 40 minutes


Topic: Slopes, Functions, Perpendicular Lines

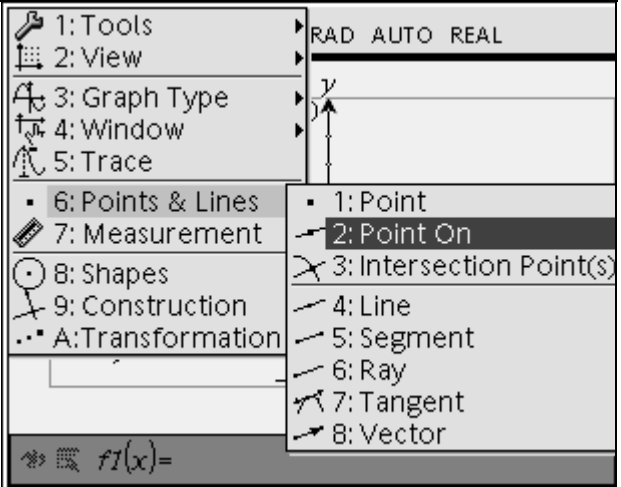
File: Algebra_SlopesofPerpendicularLines_Ilaria

<p>1) 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.</p>	 <p>The screenshot shows the TI-Nspire interface with three page tabs (1.1, 1.2, 1.3) and a mode selector (RAD, AUTO, REAL). The title is "Slopes of Perpendicular Lines". The text below reads: "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. Lesson by: Daniel R. Ilaria".</p>
<p>2) Open file: Algebra_SlopesofPerpendicularLines_Ilaria.</p> <p>Move to page 1.2 by hitting  and .</p>	 <p>The screenshot shows the TI-Nspire interface with three page tabs (1.1, 1.2, 1.3) and a file name dropdown (*Algebra_Slo...ria). The main window displays a coordinate plane with a vertical y-axis and a horizontal x-axis. The y-axis has a tick mark at 6.67 and the x-axis has a tick mark at -10. The origin is labeled with '1' on both axes. At the bottom, there is a text entry field containing the function notation $f1(x)=$.</p>

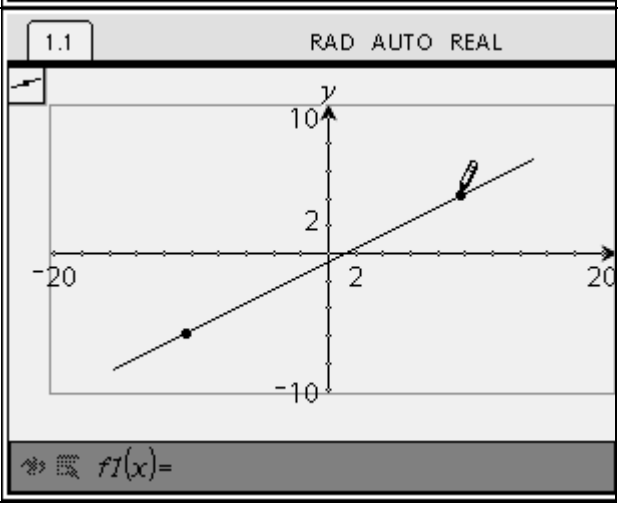
3) Hit , then choose LINE from the POINTS & LINE menu.




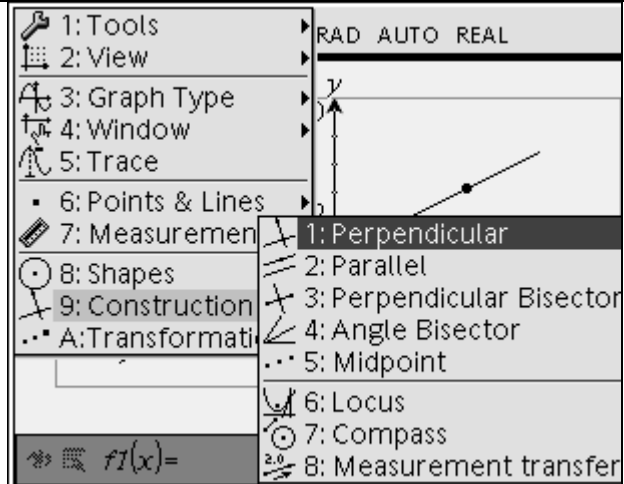
4) Construct a line on the screen. Next, under  select POINT ON from the POINTS & LINE menu






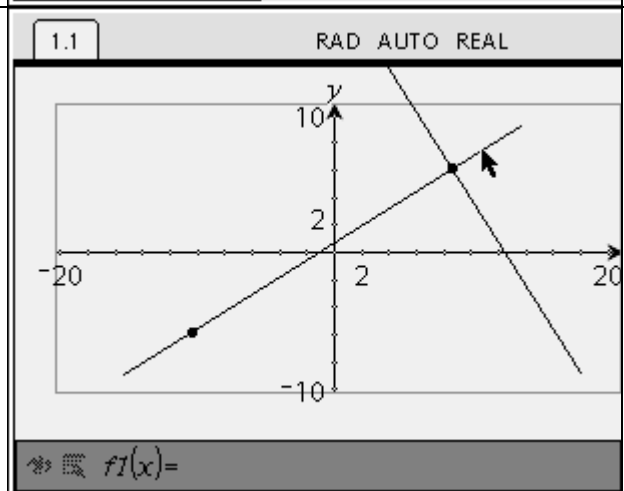
5) Place the point somewhere on the line constructed in step 4.





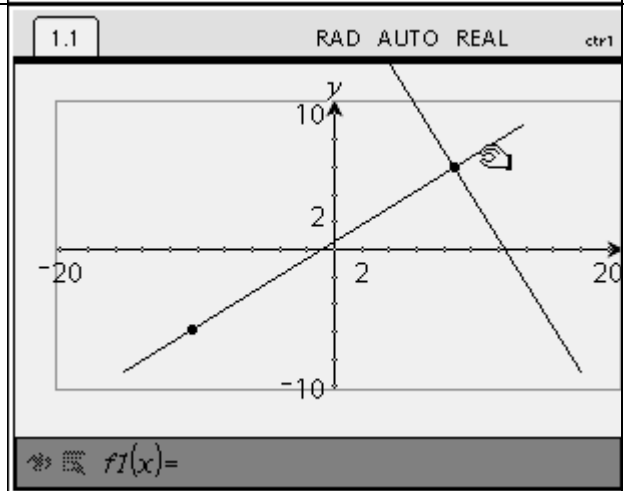
6) Construct a perpendicular line by selecting  then CONSTRUCTION and PERPENDICULAR.





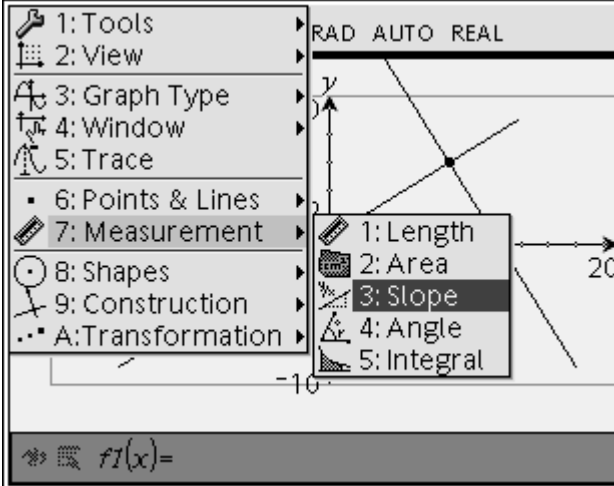
7) Hit . Move the hand over the point created in step 5. Hit . Now move the hand away from the point, but over the line on the screen. Hit  to place the perpendicular line.



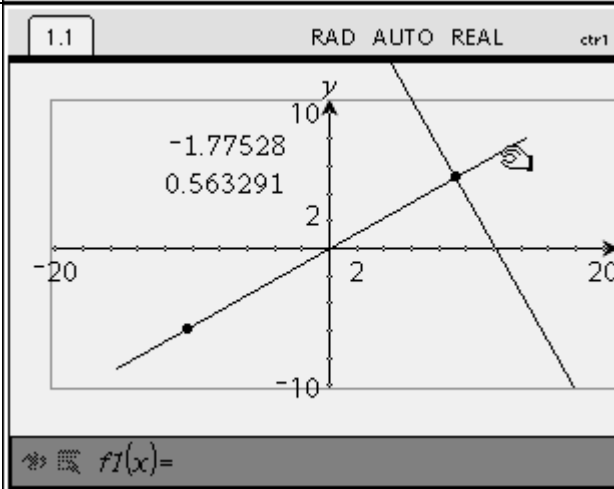
8) Check to make sure both lines move together by using  and  to grab onto the line using the NavPad to move the line.




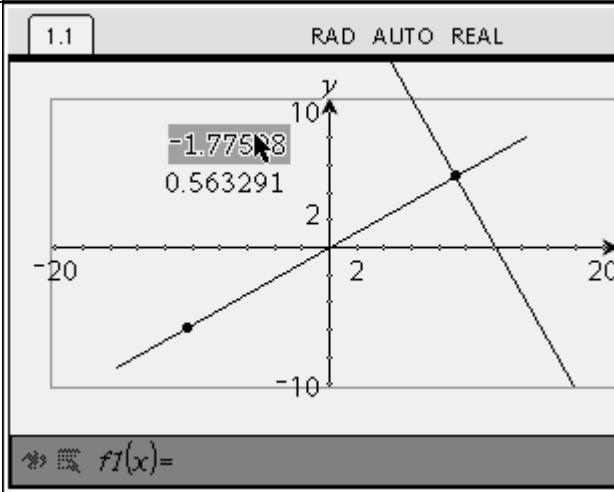
9) Calculate the slope of each line by selecting  then MEASUREMENT and SLOPE. Next, move the hand over each line and select  to select the line and again to place the value. Repeat for the second line.



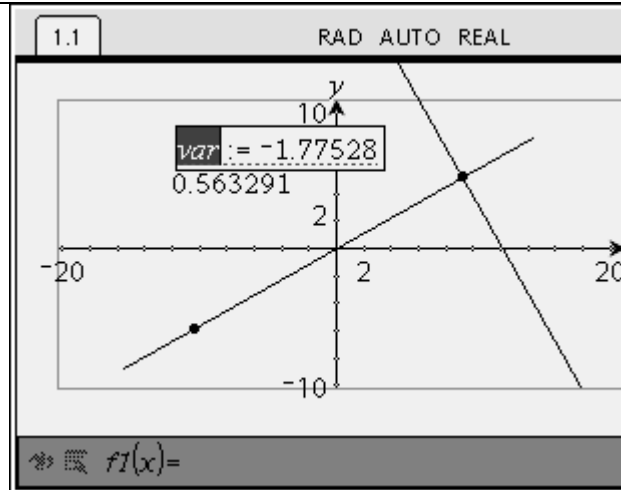
10) Move the lines around and see if you can determine a relationship between the two slope values.



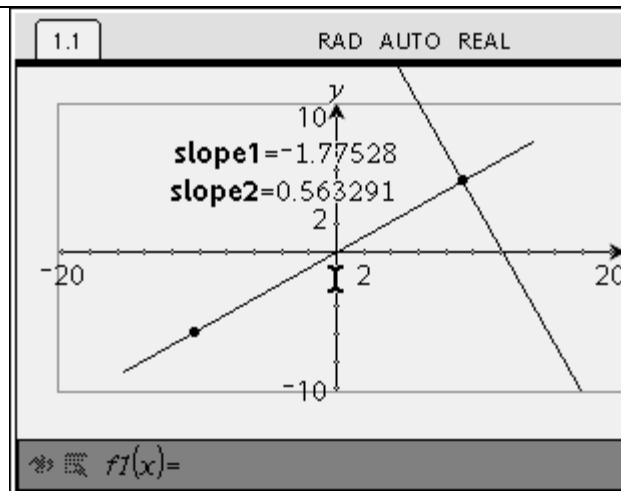
11) Create a variable for each slope by highlighting a slope value using the  button.



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




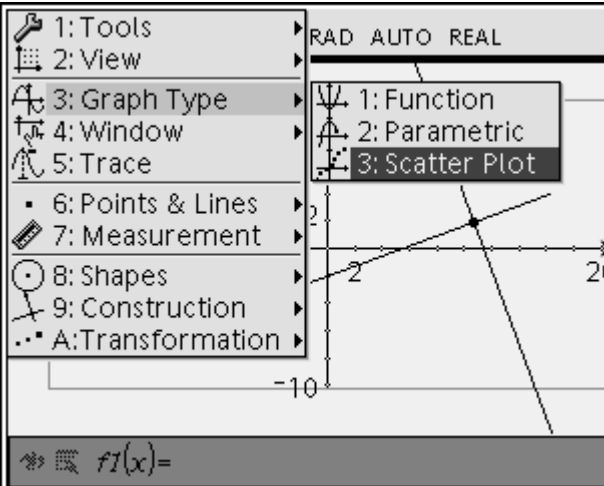

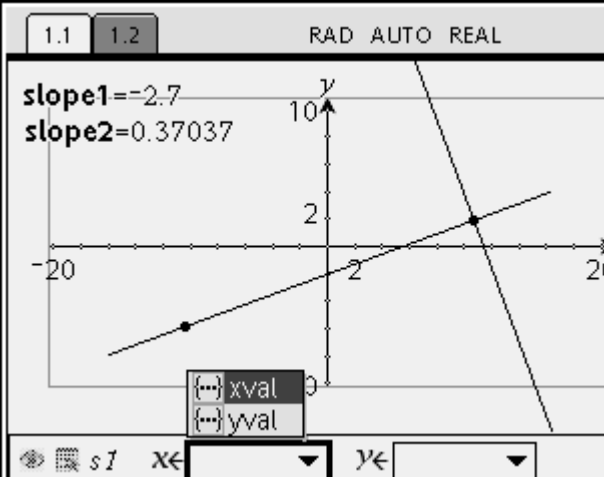


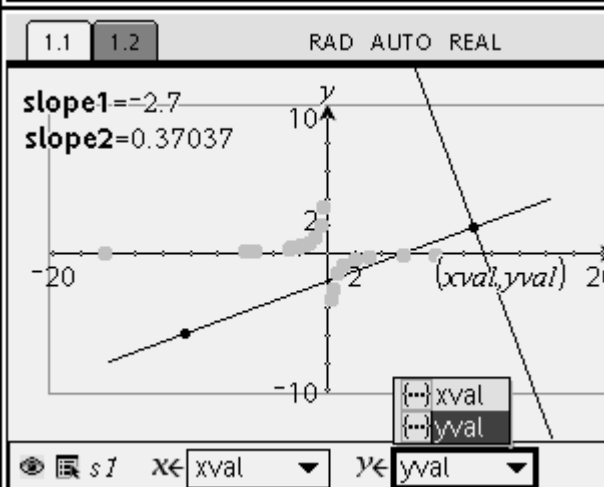
13) Your screen should be similar to this one.



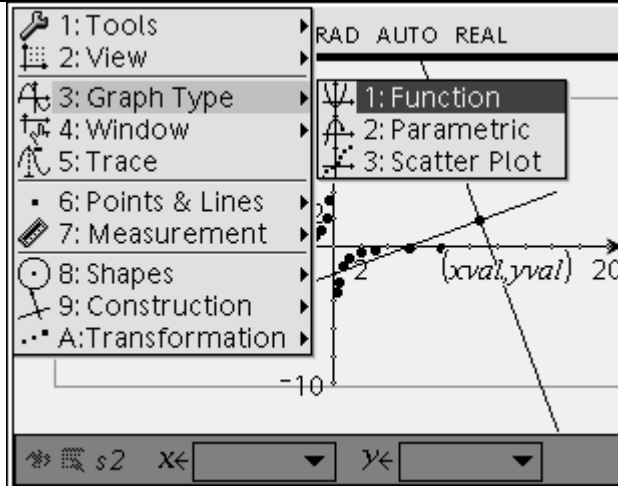
14) Once again, move the pair of perpendicular lines around and see if you can determine a relationship between the two slope values. Go to page 1.3 and examine the lists for help with determining a relationship.

(Sample screen shot on the right)

1.1 1.2 1.3 RAD AUTO REAL			
A	xval	B	yval
=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.

