

Investigating x & y Intercepts Using the TI-Nspire

by – Jessica Esquibel

Activity overview

Students will investigate x and y intercepts with graphs, tables, and equations. In this activity students will begin by discussing intersection versus intercept. Next, they will record x intercepts from a graph into a table. They will then find x-intercepts algebraically. Finally, they will write a definition of x-intercept and use what they have learned to find x-intercepts given two equations. They will continue to the next problem, which guides them through the same questions with y-intercept.

Concepts

- Graph using x-and y-intercepts
- Interpret x- and y-intercepts in multiple representations

Teacher preparation

This activity is designed for a high school algebra class.

- Students should have solved equations, but have just started investigating linear relationships so they do not know $y = mx + b$.
- The students will be able to identify, graph and interpret x- and y-intercepts in multiple representations.
- The screenshots on pages 1-3 demonstrate expected student results. Refer to the screenshots on page 4 and 5 for a preview of the student TI-Nspire document (.tns file).

Classroom management tips

- This activity is designed to be student-centered with the teacher acting as facilitator while students work cooperatively. Use the following pages as a framework as to how this activity will progress.
- The student worksheet AlgI1_x&yintercepts_worksheet_EN helps guide students through the activity and provides a place for students to record their answers and observations.

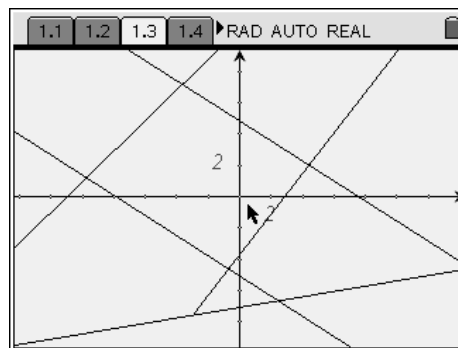
TI-Nspire Applications

Graphs & Geometry, Lists & Spreadsheet, Notes, Calculator

Step-by-step directions

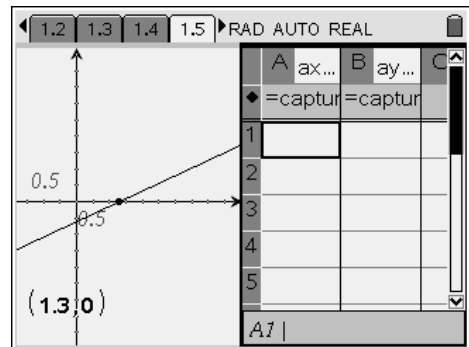
Problem 1- x intercepts

On page 1.3 students will place a point on any x and y intercept their group sees. (**Menu>Points & Lines>Point**). Students should discuss the difference in definition between x and y intercepts and intersections and record their answers on their worksheet.



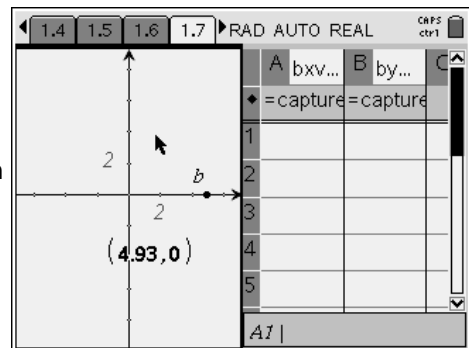
On page 1.5, students are to grab the point by holding down the \odot button and drag their line, as they move their line they are manually collecting data in the spreadsheet by pressing ctrl \odot .

NOTE: Be careful to keep the x-intercept visual on the graph while Collecting data. Press ctrl tab to move between the split screen.



On page 1.7, students should draw a Line through the point (bx,by) on the x-axis by using the **Line** tool (**Menu>Points & Lines>Line**).

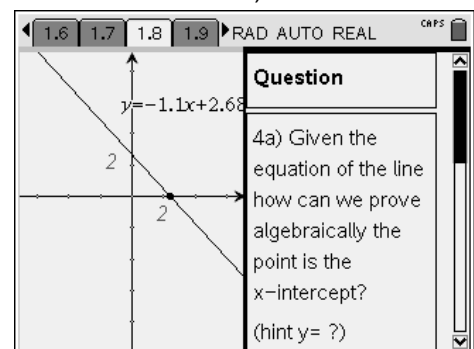
NOTE: To draw a line move to cursor over the point using the NavPad then press the \odot button once the point is blinking. Then Move the cursor anywhere on the screen and plot another point using the NavPad.



Students should have a different line from their group members. Students are to grab their line and manually collect their data in the spreadsheet (See directions above on how to grab and move and collect data)

NOTE: Be careful students keep their x-intercept visual on the Screen.

On page 1.8, students should use the graph to answer the question 4a. Students are recording their answers on their worksheet.




On pages 1.9 and 1.10 students are to answer question 5, 6a, and 6b. These questions are the assessment and evaluation for Problem 1.

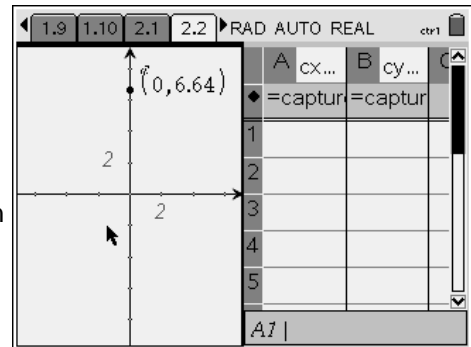
1.6 1.7 1.8 1.9 RAD AUTO REAL	
Question	
5. What is an x-intercept?	
Answer ∇	
5. Write your definition an your paper.	

1.7 1.8 1.9 1.10 RAD AUTO REAL	
Question	
6a) Find the x-intercept of $y = -1/2x - 4$.	
6b) Find the x-intercept of $y = 3x + 7$.	
Answer ∇	

Problem 2- y intercepts

On page 2.2, students should draw a Line through the point (cx,cy) on the y-axis by using the **Line** tool (Menu>Points & Lines>Line).

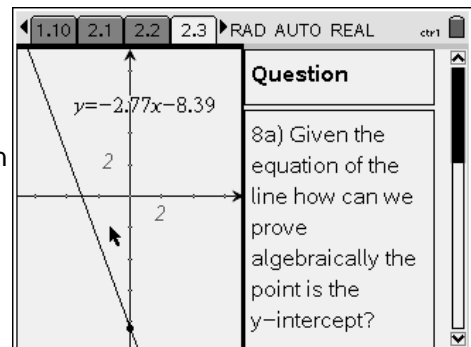
NOTE: To draw a line move to cursor over the point using the NavPad then press the  button once the point is blinking. Then Move the cursor anywhere on the screen and plot another point using the NavPad.



Students should have a different line from their group members. Students are to grab their line and manually collect their data in the spreadsheet (See directions above on how to grab and move and collect data)

NOTE: Be careful students keep their y-intercept visual on the Screen.

On page 2.3,students should use the graph to answer the question 4a. Students are recording their answers on their worksheet.



On pages 2.4, 2.5, 2.6 and 2.7 students are to answer questions 8,9,10a,10b,11,and 12. These questions are the assessment and evaluation for this lesson.

	A	x	B	y	C
1		-4		6	
2		-3		3	
3		-2		0	
4		-1		-3	
5		0		-6	

Student TI-Nspire Document

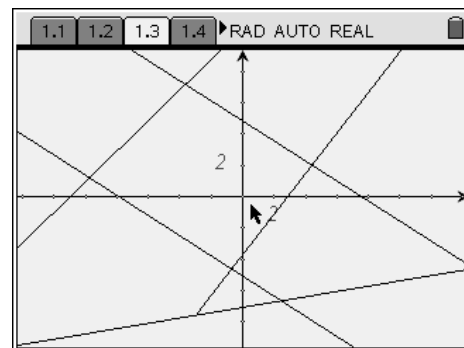
Alg1_x&yintercepts_EN.tns

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

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1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

Look at the graph on the following page and discuss in your groups the difference in definition between x and y intercepts and intersection. Place a point on any x and y intercepts your group sees. After 3 minutes we will meet as a large group to discuss your conclusions.
Please write any conclusions on your own paper (#1).



1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

On the next page a point (ax,ay) has been placed on the x-intercept. Grab and drag your line, as you move your line press ctrl period to manually collect your data in the spreadsheet. (Be careful to keep the x-intercept visual on your graph when collecting data).
Write a sentence on your paper about any

1.2 1.3 1.4 1.5 ▶ RAD AUTO REAL

1.3 1.4 1.5 1.6 ▶ RAD AUTO REAL

On the following page draw a Line through the point (bx,by) on the x-axis using the Points & Lines tool in the menu. Feel free to move the point before dawning the line. Every person in your group should have a different line. Grab and drag your line, as you move your line press ctrl period to manually collect your data in the spreadsheet. (Be careful to keep the x-intercept visual on your graph when

1.4 1.5 1.6 1.7 ▶ RAD AUTO REAL CAPS ctrl

1.6 1.7 1.8 1.9 ▶ RAD AUTO REAL CAPS

Question

4a) Given the equation of the line how can we prove algebraically the point is the x-intercept?
(hint y= ?)

1.6 1.7 1.8 1.9 ▶ RAD AUTO REAL

Question

5. What is an x-intercept?

Answer

5. Write your definition an your paper.

1.7 1.8 1.9 1.10 ▶ RAD AUTO REAL

Question

6a) Find the x-intercept of $y = -1/2x - 4$.

6b) Find the x-intercept of $y = 3x + 7$.

Answer

1.8 1.9 1.10 2.1 ▶ RAD AUTO REAL

On the following page draw a Line through the point (cx,cy) on the y-axis using the Points & Lines tool in the menu. Feel free to move the point before dawning the line. Every person in your group should have a different line. Grab and drag your line, as you move your line press ctrl period to manually collect your data in the spreadsheet. (Be careful to

1.9 1.10 2.1 2.2 ▶ RAD AUTO REAL ctrl

2.3 2.4 2.5 2.6 RAD AUTO REAL CAS

$y = -2.77x - 8.39$

Question

8) Given the equation of the line how can we prove algebraically the point is the y-intercept? (hint ?= ?)

2.1 2.2 2.3 2.4 RAD AUTO REAL

Question

9. What is an y-intercept?

Answer

9. Write your definition an your paper.

2.2 2.3 2.4 2.5 RAD AUTO REAL

Question

10a) Find the y-intercept of $y = 3x + 12$.

10b) Find the x and y-intercept of the equation $4x - 6y = 12$.

2.3 2.4 2.5 2.6 RAD AUTO REAL ctrl

Question

11.) What is the y-intercept of the graph?

Answer

11.) Please show your work on

2.4 2.5 2.6 2.7 RAD AUTO REAL

	A	x	B	y	C
1	-4	6			
2	-3	3			
3	-2	0			
4	-1	-3			
5	0	-6			

Question

12.) Find the x-intercept from the table

Answer

12.) Please

A7 | -4