Math Objectives

- Students will test ordered pairs to determine if they are part of the solution set to an inequality.
- Students will use appropriate tools strategically (CCSS Mathematical Practices).

Vocabulary

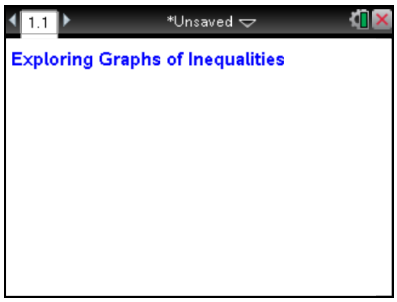
- linear equation
- inequality symbols: <, >, ≥, ≤
- slope
- *y*-intercept

About the Lesson

- In this activity, students will test ordered pairs to determine if they are part of the solution set to an inequality.
- You have the option of allowing students to create a new document or use a document that is already created. Should you opt to have students create the document, you may wish to use *Exploring_Graphs_of_Inequalities_Create.pdf.*

TI-Nspire™ Navigator™ System

- Use Screen Capture to observe students' work as they proceed through the activity.
- Use Live Presenter to have a student illustrate how he or she used a certain tool.



TI-Nspire™ Technology Skills:

- Download a TI-Nspire document
- Open a document
- Move between pages
- Grab and drag a point

Tech Tips:

- Make sure the font size on your TI-Nspire handheld is set to Medium.

Lesson Materials:

Create Instructions

Exploring_Graphs_of_Inequalities_Create.pdf

Student Activity

Exploring_Graphs_of_Inequalities _Student.pdf

Exploring_Graphs_of_Inequalities _Student.doc

TI-Nspire document

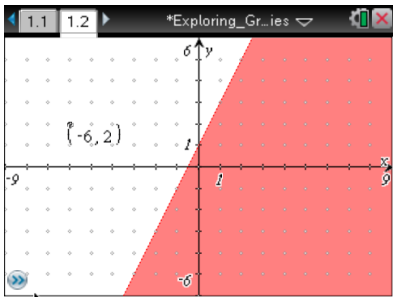
Exploring_Graphs_of_Inequalities.tns

Visit www.mathnspired.com for lesson updates and tech tip videos.

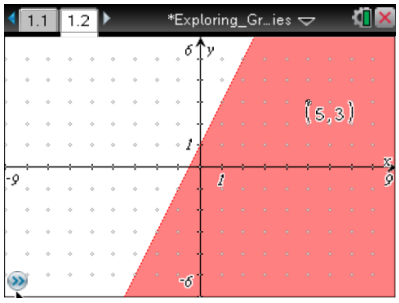
Discussion Points and Possible Answers

Tech Tip: If students experience difficulty dragging a point, check to make sure that they have moved the cursor arrow until it becomes a hand (☜). They should then press ctrl ⬚ to grab the point and close the hand (☜). Once a function has been graphed, the entry line can be shown by pressing ctrl G. The entry line can also be expanded or collapsed by clicking the chevron.

Move to page 1.2.



Teacher Tip: You may choose to have students construct part of this activity as noted earlier.



Move the Point

Step 1: Move the cursor until ☜ and *point* appear around the point on the grid.

Step 2: To grab that point, press ctrl ⬚ .The ☜ will change to ☜.

Step 3: Use the Touchpad or Clickpad to move the point around the screen. Notice that the coordinates change as you move the point.

Step 4: Press esc to stop moving the point.

Test Ordered Pairs

Step 1: Given the inequality $y < 2x + 1$, move the point as indicated in Column 1 of the table on the next page of this worksheet.

Step 2: Complete Columns 2, 3, and 4 on this worksheet.

Change the Inequality Sign

Step 1: Show the entry line by pressing ctrl G.

Step 2: Press ▲ to display the current relation.

Step 3: Press ◀ until the cursor is between < and 2

Step 4: Press [del] to erase the <. A menu will pop up showing inequality options.

Step 5: Press the ▼ until the ≥ symbol is highlighted. Press [enter].

Now complete columns 5 and 6 on this worksheet.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Location of the Point	Coordinates of the Point (x, y)	Substitute the coordinates in the inequality. $y < 2x + 1$ True or False?	What observations can you make about the point in relation to the shaded area of the graph?	Substitute the coordinates in the inequality. $y \geq 2x + 1$ True or False?	What observations can you make about the point in relation to the shaded area of the graph?
Move the point to Quadrant I	(1,5)	$5 < 2(1) + 1$ $5 < 3$ False	Not in the shaded area.	$5 \geq 2(1) + 1$ $5 \geq 2 + 1$ $5 \geq 3$ True	Is in the shaded area.
Move the point to Quadrant II	(–3,2)	$2 < 2(–3) + 1$ $2 < –6 + 1$ $2 < –5$ False	Not in the shaded area.	$2 \geq 2(–3) + 1$ $2 \geq –3 + 1$ $2 \geq –2$ True	Is in the shaded area.
Move the point to Quadrant III	(–1,–2)	$–2 < 2(–1) + 1$ $–2 < –2 + 1$ $–2 < –1$ True	Is in the shaded area.	$–2 \geq 2(–1) + 1$ $–2 \geq –2 + 1$ $–2 \geq –1$ False	Not in the shaded area.
Move the point to Quadrant IV	(3,–1)	$–1 < 2(3) + 1$ $–1 < 7$ True	Is in the shaded area.	$–1 \geq 2(3) + 1$ $–1 \geq 6 + 1$ $–1 \geq 7$ False	Not in the shaded area.
Move to a location on the line $y = 2x + 1$	(1,3)	$3 < 2(1) + 1$ $3 < 2 + 1$ $3 < 3$ False	Is not in the shaded area, and is not on the line.	$3 \geq 2(1) + 1$ $3 \geq 2 + 1$ $3 \geq 3$ True	Is not in the shaded area, but is on the line.

Wrap Up

Upon completion of the discussion, the teacher should ensure that students can explain:

- When to have a dotted line and when to have a solid line when graphing inequalities.

Assessment

For each of the following, state whether the graph of the line is solid or dotted, and whether the graph is shaded above or below the graph of the line:

1. $y \geq x - 3$
2. $y < -2x + 1$
3. $y \leq \frac{1}{2}x - 2$

Answers:

1. solid; above
2. dotted; below
3. solid; below