

## Understanding Graphs of Linear Inequalities

by – Margaret Bambrick

### Activity overview

*Students will explore graphs of linear inequalities and determine how to graph an inequality and use the correct vocabulary to describe the graph.*

### Concepts

*Graphical Solutions to Linear Inequalities*

*Open and Closed Half-planes*

*Boundary lines*

### Teacher preparation

*This activity is designed to be used in an Algebra I classroom prior to graphing linear inequalities by hand. Students should know how to drag a point, and copy and edit a previous entry on a calculator page.*

### Classroom management tips

*Students may work in pairs or independently. Four problems are set up in the tns file so that when students edit the document, they do not have to edit the inequality symbol: Problem 2 - less than or equal to, Problem 3 – less than, Problem 4 - greater than or equal to, and Problem 5 - greater than.*

### TI-Nspire Applications

*Notes, Graphs & Geometry, and Calculator*

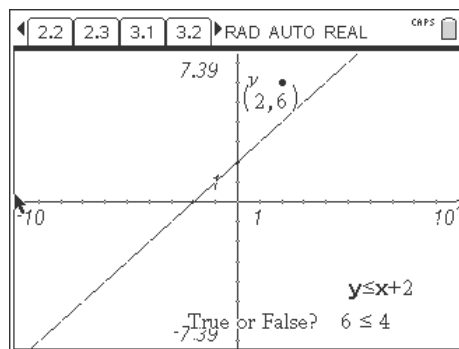
### Step-by-step directions

*Step 1: Students will drag the ordered pair on page 2.2 to each of the other quadrants and respond to questions on the student worksheet.*

*Step 2: Students will confirm the truth value of the inequality in the lower right corner using the calculator page 2.3.*

*Step 3: Students will repeat steps 1 and 2 with three other inequalities on pages 3.2, 3.3, 4.2, 4.3, 5.2, and 5.3 of the tns file.*

*Step 4: Students will know how to graph a linear inequality without using handheld technology and describe that process to another student.*



### Assessment and evaluation

Question 7 could be used as an assessment item for this activity.

### Activity extensions

- *Students could graph two inequalities on the same coordinate plane and test coordinates in each region.*

Student TI-Nspire Document  
*Linear\_Inequality.tns*

1.1 1.2 2.1 2.2 ▸ RAD AUTO REAL CRPS

### Understanding Graphs of Linear Inequalities

1.1 1.2 2.1 2.2 ▸ RAD AUTO REAL CRPS

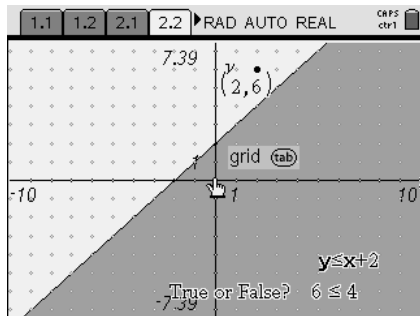
Explore the inequalities given by your teacher, use the appropriate Problem 2–5 in the tns file based on the type of inequality:

Problem 2: less than or equal to ( $\leq$ )  
 Problem 3: less than ( $<$ )  
 Problem 4: greater than or equal to ( $\geq$ )  
 Problem 5: greater than ( $>$ )

1.1 1.2 2.1 2.2 ▸ RAD AUTO REAL CRPS

Less than or equal to

$\leq$



1.2 2.1 2.2 2.3 ▸ RAD AUTO REAL CRPS

© True or False? Confirm your response for

Done

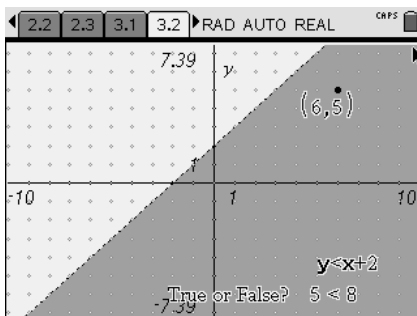
$6 \rightarrow y: 2 \rightarrow x: y \leq x + 2$	false
$2 \rightarrow x: 6 \rightarrow y: y \leq x + 2$	false

3/99

2.1 2.2 2.3 3.1 ▸ RAD AUTO REAL CRPS

Less than

$<$



2.3 3.1 3.2 3.3 ▸ RAD AUTO REAL CRPS

© True or False? Confirm your response for

Done

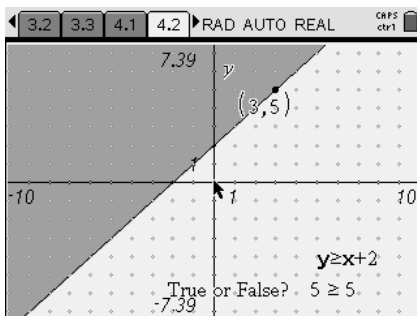
$6 \rightarrow x: 5 \rightarrow y: y < x + 2$	true
---	------

2/99

3.1 3.2 3.3 4.1 ▸ RAD AUTO REAL CRPS

Greater than or equal to

$\geq$



3.3 4.1 4.2 4.3 ▸ RAD AUTO REAL CRPS

© True or False? Confirm your response for

Done

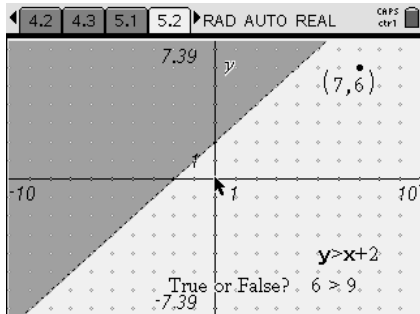
$5 \rightarrow y: 3 \rightarrow x: y \geq x + 2$	true
--	------

2/99

4.1 4.2 4.3 5.1 ▸ RAD AUTO REAL CRPS

Greater Than

$>$



© True or False? *Confirm your response for*

*Done*

7 → y: 6 → x:  $y > x + 2$       false

2/99

**Question**

Define the following in your own words:

1. **open half-plane**
2. **closed half-plane**
3. **steps to graphing** a linear inequality without technology.