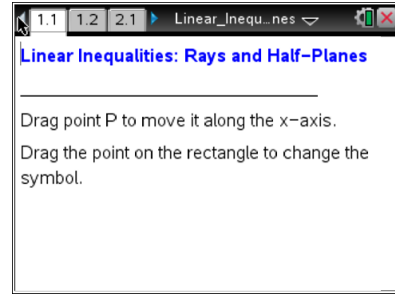




Open the TI-Nspire document

*Linear\_Inequalities\_Rays\_and\_Half-Planes.tns.*

When you graph an inequality in one variable on a number line, you shade all the points to one side of a boundary point. What happens when you graph an inequality in two variables? This activity will reveal the connection.



**Move to page 1.2.**

1. Move point  $P$ . Describe the changes that occur on both the number line and the coordinate plane as you move the point. What stays the same?
2. a. Move point  $P$  so that the inequality at the bottom of the screen is  $x < -2$ . Move point  $A$  around in the shaded area. How is the  $x$ -coordinate of point  $A$  related to the number line and inequality statement at the bottom of the screen?  
  
b. Is it possible to move point  $A$  to find an ordered pair in the unshaded region where the  $x$ -coordinate in the ordered pair is less than  $-2$ ? Why or why not?
3. a. How does the solution set for  $x < -2$  on the number line differ from the solution set in the coordinate plane?  
  
b. Which of the following ordered pairs are in the solution set for  $x < -2$  in the coordinate plane?  
  
(-10, 3) (-2, 2) (0, -4) (-1.5, 0) (-2.5, -2)
4. Grab the point on the box surrounding the inequality symbol. Move the box to change the inequality symbol selected. Describe the changes that occur on both the number line and the coordinate plane. What stays the same?



5. Describe the characteristics of the graphs of each of the following:

For the Given Inequality	$x < 3$	$x \leq 3$	$x = 3$	$x \geq 3$	$x > 3$
In one variable, is the circle open or closed?					
In two variables, is the boundary line dotted or solid?					
Is the shading to the right or left?					

6. Give an example of an inequality such that the graph has:
- an open circle and dotted line
  - a solid line and shading to left
  - shading to the right
  - shading to the left and a closed circle
7. Tejal says, "The graph of  $x < -12$  in the coordinate plane would have a dotted boundary line and be shaded to the right." Do you agree? Why or why not?

**Move to page 2.1.**

8. Observe the coordinates of point  $A$  as you move through the shaded region, to the line, and through the unshaded region.
- Use what you observe to explain why the inequality  $y < 3$  describes the solution set for the shaded area on the coordinate plane.
  - How is the solution set for  $y < 3$  for the plane different from the solution set for  $y < 3$  on the number line?



# Linear Inequalities: Rays and Half-Planes

Name \_\_\_\_\_

Student Activity



Class \_\_\_\_\_

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9. Compare the graphs of  $x < 4$  and  $y < 4$  as inequalities graphed in the coordinate plane.
- How are they similar?
  
  
  
  
  
  
  
  
  
  
  - How are they different?