Name _____

6-5 Systems of Linear Inequalities

OBJECTIVE: **I can solve systems of linear inequalities by graphing to model real-world situations using linear inequalities**

Warm-Up

You want to buy at least 6 new ring tones from a Web site, but you cannot spend more than $15. How many premium ring tones and how many top-10 ring tones can you buy? Explain how you found your answer.

Essential Understanding

Essential Understanding You can graph the solutions of a system of linear inequalities in the coordinate plane. The graph of the system is the region where the graphs of the individual inequalities overlap.

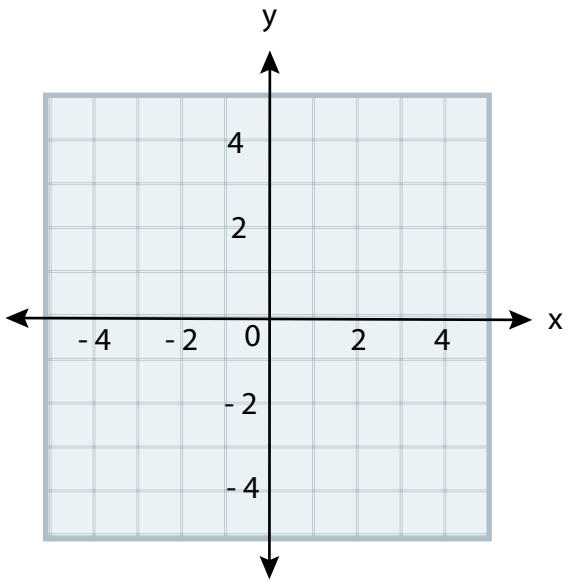
A system of linear inequalities is made up of two or more linear inequalities. A solution of a system of linear inequalities is an ordered pair that makes all the inequalities in the system true. The graph of a system of linear inequalities is the set of points that represent all of the solutions of the system.

Example #1 Graphing a System of Inequalities

What is the graph of the system?

$y < 2x - 3$

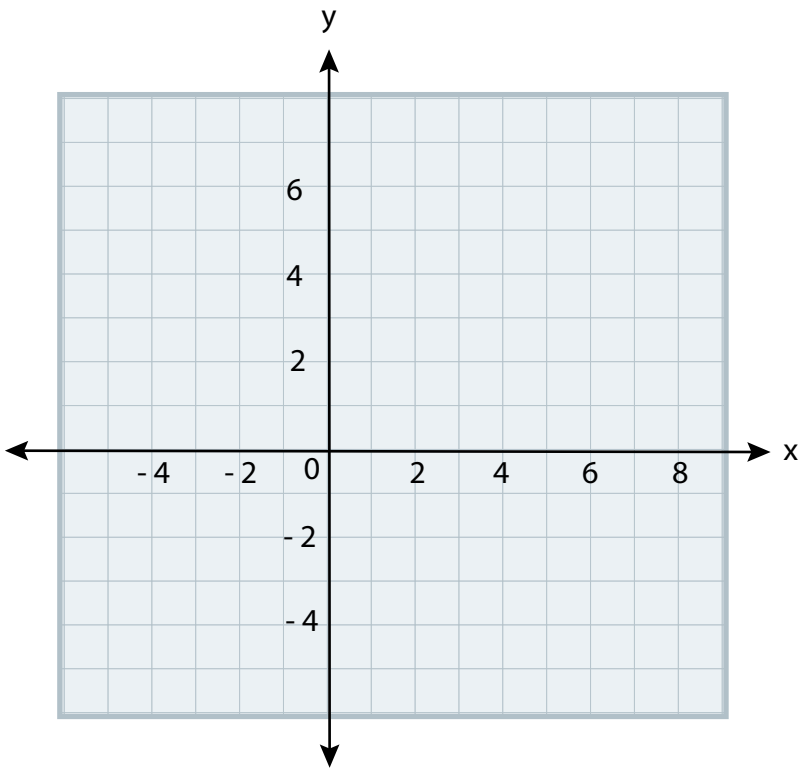
$2x + y > 2$



Your Turn to Work it Out

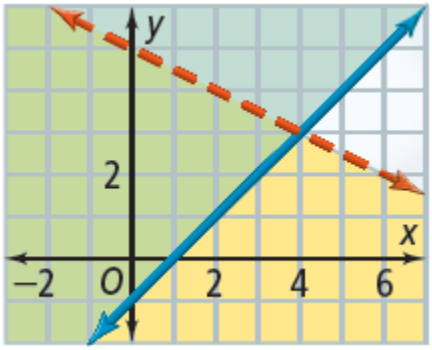
1. What is the graph of the system?

$$y \geq -x + 5$$
$$-3x + y \leq -4$$



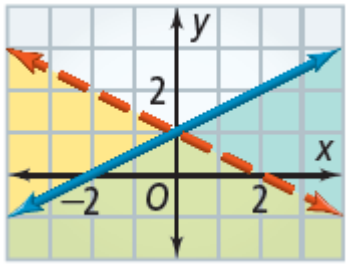
Example #2 Writing a System of Inequalities From a Graph

What system of inequalities is represented by the graph below?



Your Turn to Work it Out

2. What system of inequalities is represented by the graph?



Concept Understanding

Graphing Linear Inequalities

A graphing calculator can show the solutions of an inequality or a system of inequalities.

To enter an inequality, press APPS (ANGLE B) and scroll down to select **INEQUALZ**. Move the cursor over the = symbol for one of the equations. Notice the inequality symbols at the bottom of the screen, above the keys labeled **F2–F5**.

Change the = symbol to an inequality symbol by pressing ALPHA (A-LOCK) followed by one of **F2–F5**.

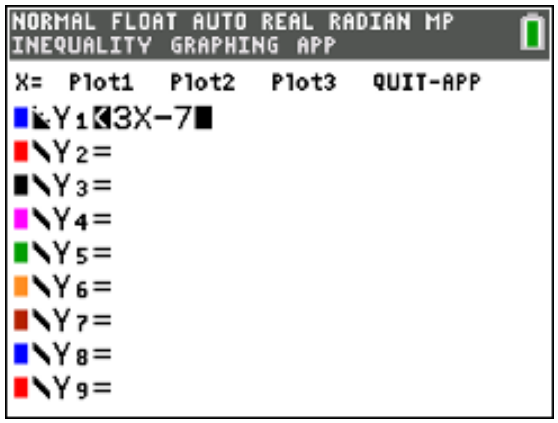
Activity 1

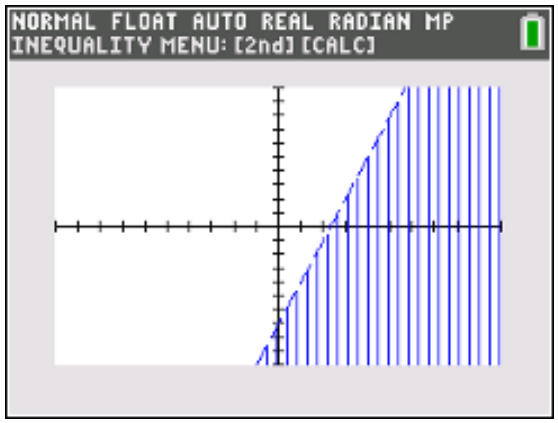
Graph the inequality $y < 3x - 7$.

1. Move the cursor over the Y_1. Press ENTER (ENTRY SOLVE), scroll to Y [=] and select Y [<]. Press OK and ENTER (ENTRY SOLVE).

2. Enter the given inequality as $\mathbf{Y}_1$.

3. Press GRAPH (TABLE F5) to graph the inequality.





Concept Understanding

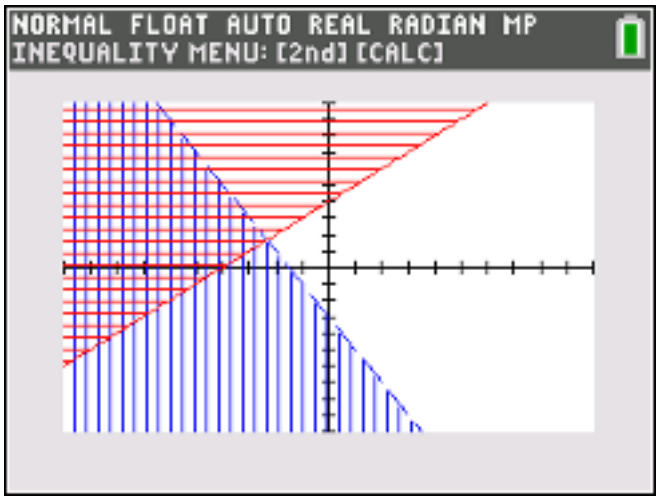
Graph the system. $y < -2x - 3$
$y \geq x + 4$

To graph $y < -2x - 3$

1. Move the cursor over the Y_1. Press ENTRY SOLVE ENTER, scroll to Y [=] and select Y [<]. Press OK and ENTRY SOLVE ENTER Enter the given inequality as Y_1.

To graph $y \geq x + 4$

2. Move the cursor over the Y_2. Press ENTRY SOLVE ENTER, scroll to Y [=] and select Y [≥]. Press OK and ENTRY SOLVE ENTER Enter the given inequality as Y_2.
3. Press TABLE F5 GRAPH to graph the inequality.



Exercises

Use a graphing calculator to graph each inequality. Sketch your graph.

7. $y \leq x$

8. $y > 5x - 9$

9. $y \geq -1$

10. $y < -x + 8$

Use a graphing calculator to graph each system of inequalities. Sketch your graph.

11. $y \geq -x + 3$
$y \leq x + 2$

12. $y > x$
$y \geq -2x + 5$

13. $y \geq -1$
$y < 0.5x - 2$

14. $y \geq 2x - 2$
$y \leq 2x - 4$