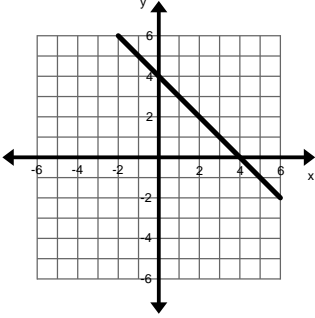
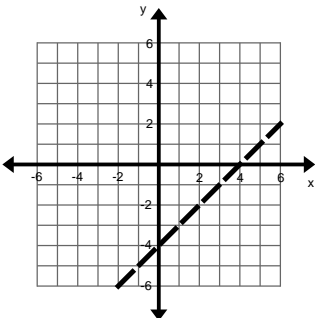
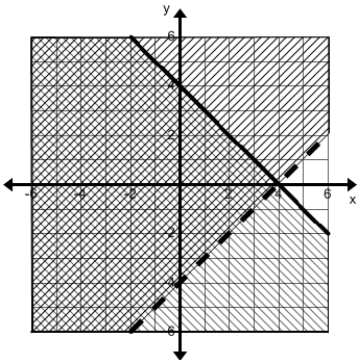
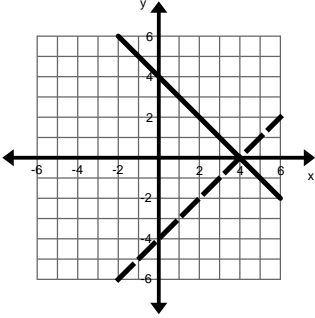


# Graphing Systems of Inequalities

To graph a system of inequalities, we graph each inequality and then find the intersection of the graphs.

**Example 1:** Graph the system of inequalities  $x + y \leq 4$   
 $x - y < 4$ .

	<p>Graph <math>x + y \leq 4</math>.</p> <p>Notice that the boundary line is solid because the inequality symbol is <math>\leq</math>.</p> <p>The test point <math>(0,0)</math> is a solution, therefore we shade the region containing the point.</p>
	<p>Graph <math>x - y &lt; 4</math>.</p> <p>Notice that the boundary line is dashed because the inequality symbol is <math>&lt;</math>.</p> <p>The test point <math>(0,0)</math> is a solution, therefore we shade the region containing the point.</p>
	<p>The solution to the system of inequalities is the region where both shadings overlap.</p>
	<p>The graph of just the solution set.</p>

**Example 2:**

A theater wants to take in at least \$2,000 for a certain matinee. Children’s tickets cost \$5 each and adult’s tickets cost \$10 each.

- a. Write an inequality describing the number of tickets that will allow the theater to meet their goal of \$2,000.
- b. If the theater has a maximum of 350 seats, write an inequality describing the number of both types of tickets the theater can sell.
- c. Graph the system of inequalities.
- d. Find 1 solution that works and explain how you know that it works.
- e. Find at 1 solution that does not work and explain how you know that it doesn’t work.

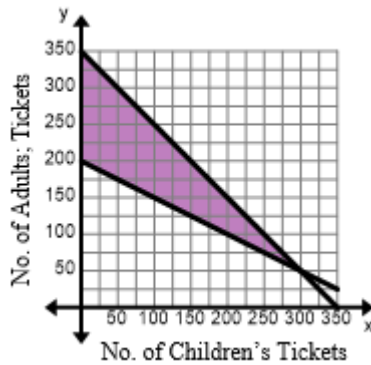
a.  $5x + 10y \geq 2000$

Let  $x$  equal the number of children’s tickets sold.  
Let  $y$  equal the number of adults, tickets sold.  
They want to raise at least 2,000 or more.

b.  $x + y \leq 350$

At most 350 tickets can be sold.

c.



There will not be any negative number of tickets sold so  $x \geq 0$  and  $y \geq 0$ .

- d. 100 children’s tickets and 175 adults’ tickets. This would result in 275 tickets being sold, which is less than 350, and \$2250 in sales which is more than \$2,000.
- e. 200 children’s tickets and 75 adults’ tickets. This would result in 275 tickets being sold, but the sales would only be \$1750 which is less than the desired \$2,000.