Name ____ Date ____________ Class _____________

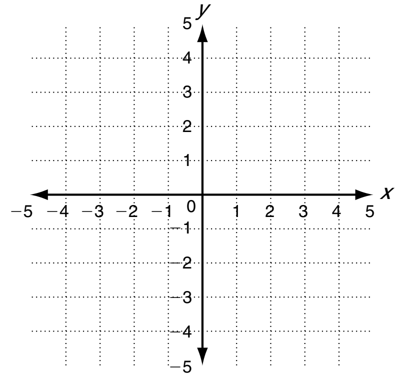
LESSON 6-6

Challenge

Solving Systems of Linear Inequalities

Recall that $|x|$ has two parts in its definition. If $x \geq 0$, then $|x| = x$. If $x < 0$, then $|x| = -x$. This definition is useful when dealing with systems of inequalities that involve absolute value.

In Exercises 1 and 2, consider $\begin{cases} y \geq |x| - 4 \\ y \leq -|x| + 4 \end{cases}$.



1. Consider $y \geq |x| - 4$.

a. On the grid at right, graph $y = |x| - 4$. Shade the part of the plane that is the solution to $y \geq |x| - 4$. (Test points to help decide on what part of the plane to shade.)

b. On the grid at right, graph $y = -|x| + 4$. Shade that part of the plane that is the solution to $y \leq -|x| + 4$.

2. Describe the region that is the common solution to the two absolute-value inequalities.

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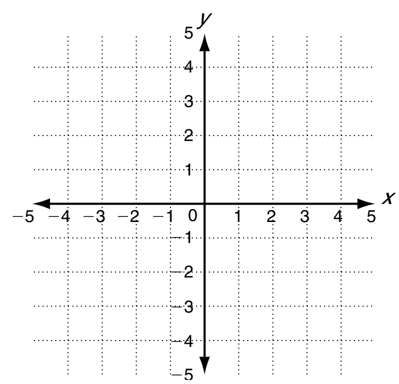
You can reverse the process and represent a specified region by using a system of inequalities.



3. On the grid at right, graph the vertical lines $x = 3$ and $x = -3$. Also graph the horizontal lines $y = 5$ and $y = -5$.

a. Write a pair of absolute-value inequalities whose graphs are the interior of the rectangle formed.

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b. Write a pair of absolute-value inequalities whose graphs are the exterior of the rectangle formed.

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4. Explain how to modify the solution to Exercise 3 in order to represent the rectangle whose sides are bounded by the vertical lines $x = -1$ and $x = 3$ and the horizontal lines $y = 2$ and $y = 8$. Then write the system of absolute-value inequalities.

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5. The sides of a square are horizontal and vertical line segments whose diagonals meet at the origin. Represent the square and its interior by using a system of absolute-value inequalities.

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