Homework 6   What's My Inequality?

Graphs of inequalities play an important role in understanding some problem situations. In *Picturing Cookies—Part I,* you started from an algebraic statement— a linear inequality from the unit problem—and saw that its graph was a half plane.

In this assignment, you go from graphs back to algebra. In Part I, you are given graphs that are straight lines, and your task is to find the corresponding linear equations. In Part II, you are given the equation for a straight line, and your task is to find the inequality corresponding to the half plane on one side of that line.

Part I: Find the Equation

For each of the straight lines in graphs 1 through 4, write a linear equation whose graph is that straight line.
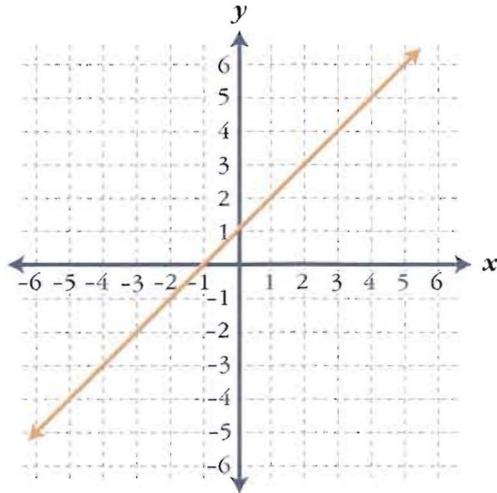
Also describe in words the process by which you found the equation.
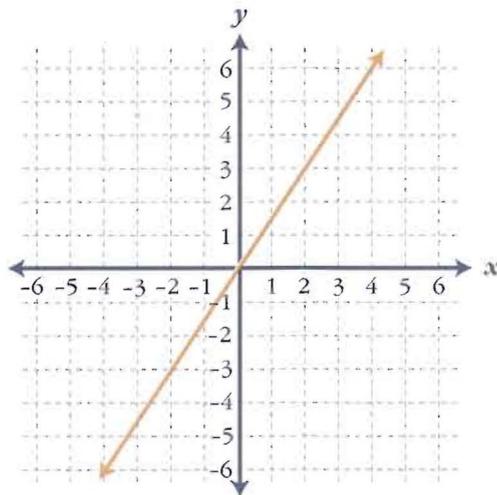
1.

2.

3.

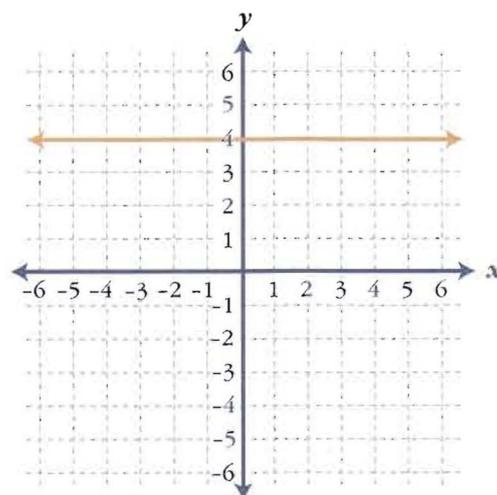**4.**
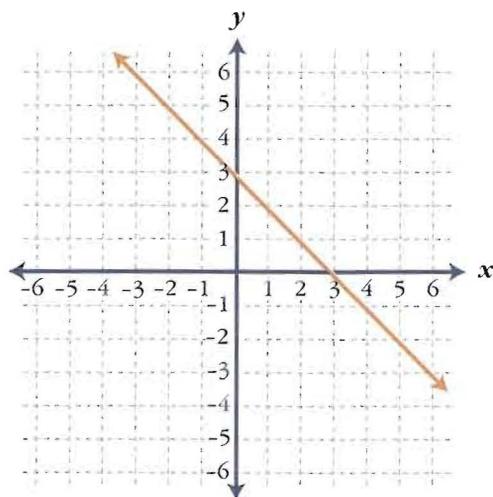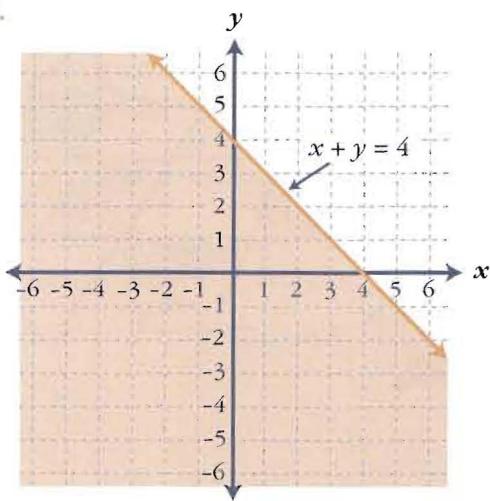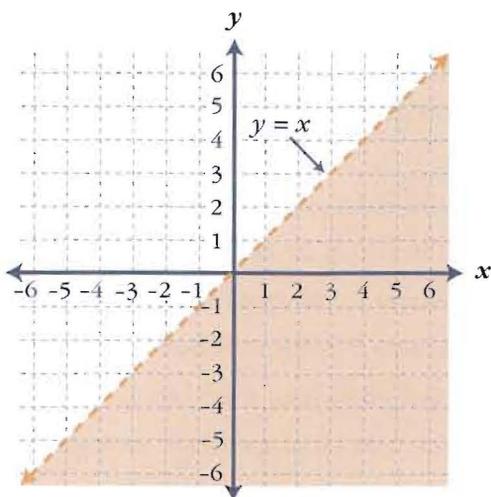
Part II: Find the Inequality

The shaded area in each of graphs 5 through 8 represents a half plane. (You should imagine that the shaded area continues indefinitely, including all points on the shaded side of the given line.) In each case, you are given an equation for the straight line that forms the boundary of the half plane. Your task is to find a linear inequality whose graph is the half plane itself.

Note: If the boundary is shown as a dashed line, it is not considered part of the shaded area. If the boundary is shown as a solid line, it is considered part of the shaded area. This is a common convention, similar to the convention of open and filled-in circles used in *Homework 2: Investigating Inequalities* for graphs in one variable.
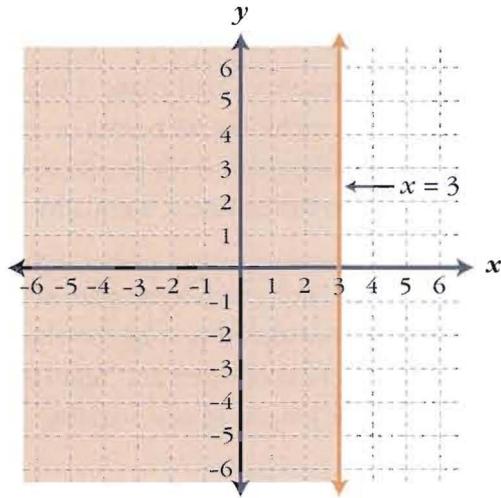
5.

$x + y = 4$

6.

$y = x$

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7.

y

6
5
4
3
2   ← *x* = 3
1

-6 -5 -4 -3 -2 -1   1 2 3 4 5 6   *x*
-1
-2
-3
-4
-5
-6

8.

y

6
5
4
3
2
1

-6 -5 -4 -3 -2 -1   1 2 3 4 5 6   *x*
-1
-2
-3
y = -2
-4
-5
-6