Lesson 6-4

Example 1

Tell whether the ordered pair is a solution of the inequality.

a. (1, 5); $y \geq 4x - 2$

b. (-3, 2); $y < 3x - 1$

Solution

a. Substitute 1 for x and 5 for y in the inequality.

$y \geq 4x - 2$
$5 \geq 4(1) - 2$
$5 \geq 2$ ✓

Since the inequality is true, the ordered pair (1, 5) is a solution of $y \geq 4x - 2$.

b. Substitute -3 for x and 2 for y in the inequality.

$y < 3x - 1$
$2 < 3(-3) - 1$
$2 \square -10$
Since the inequality is false, the ordered pair (-3, 2) is not a solution of $y < 3x - 1$.

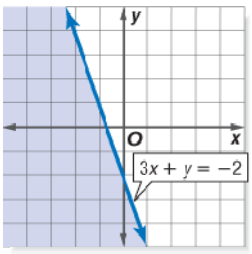
Example 2

Graph $3x + y \leq -2$.

Solution

Graph the equation $3x + y = -2$ as the boundary.
Rewrite the equation in slope-intercept form.

$$\begin{aligned} 3x + y &= -2 \\ 3x - 3x + y &= -2 - 3x \\ y &= -3x - 2 \end{aligned}$$



The slope is -3 and the y-intercept is -2.

Since the inequality symbol includes "equal to," use a solid line. Then choose and test a point: (0, 0).

$3x + y \leq -2$
$3(0) + 0 \leq -2$ Use $x = 0$ and $y = 0$.
$0 \leq -2$ ✓

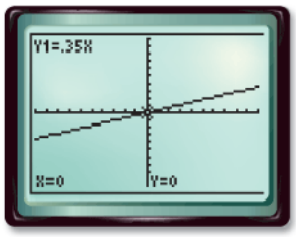
Since (0, 0) does not satisfy the inequality, shade the region that does not include (0, 0). The solution is the lower half plane.

Example 3

BUSINESS Rachael typically spends 35% of her day dealing with customers. The amount of time she spends with customers is modeled by the equation $C = 0.35t$, where t is the total time spent working and C is the amount of time spent with customers. Determine when her time spent with customers is less than or equal to 35% of her total time.

Solution

A graphing utility can help you graph when a slope is given in decimal form. Replace C with y and t with x. Enter the equation $y = 0.35x$ and graph the line.



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Since the problem is stated less than or equal to, the inequality is $y \leq 0.35x$. Display the line as a solid line. Choose a test point: (1, 0). Determine if (1, 0) is a solution.

$y \leq 0.35x$
$0 \leq 0.35(1)$
$0 \leq 0.35$

Since (1, 0) is below the line, shade the lower half plane. If your graphing utility does not have a shade feature, then graph and shade the region on grid paper.

The line and the shaded region of the graph show when the amount of time Rachel spends with customers is less than or equal to 35% of her day.