

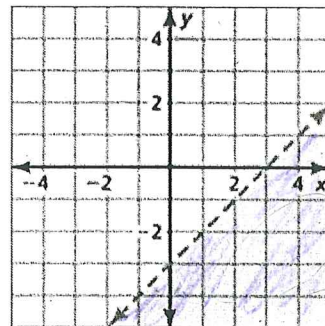
CW 2

Algebra Foundations

Graphing a Linear Inequality in Two Variables Notes

$y = x - 3$

Example: Here is the graph of $y < x - 3$



Graphing a Linear Inequality in Two Variables

Step 1 Graph the boundary line for the inequality.

Use a dashed line for $<$ or $>$. Use a solid line for \leq or \geq .

Step 2 Test a point that is not on the boundary line to determine whether it is a solution of the inequality.

Step 3 When a test point is a solution, shade the half-plane that contains the point. When the test point is *not* a solution, shade the half-plane that does *not* contain the point.

In Exercises 1–3, tell whether the ordered pair is a solution of the inequality.

1. $5x + y < 7$; $(2, -2)$ NO

$5(2) + (-2) < 7$?

$10 - 2 < 7$ $8 < 7$?

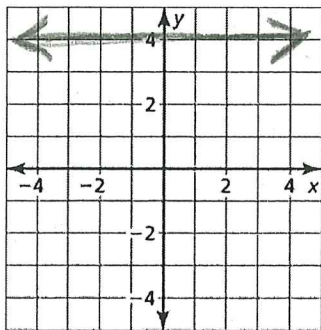
2. $-x - 2y \geq 5$; $(-2, -3)$ YES

$-(-2) - 2(-3) \geq 5$?

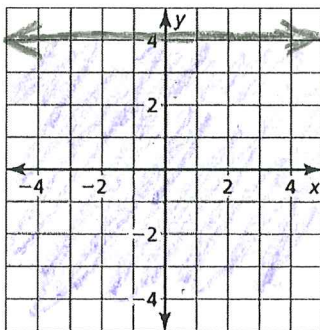
$2 + 6 \geq 5$ $8 \geq 5$

In Exercises 3–12, graph the line. Then graph the linear inequality in a coordinate plane.

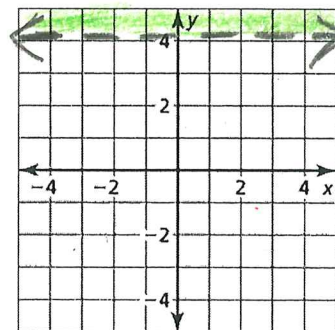
3. $y = 4$ $y = 0x + 4$



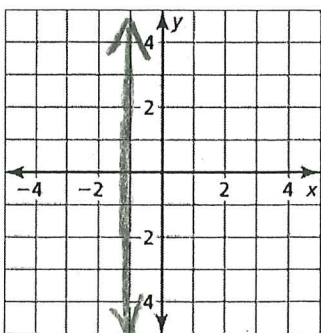
$y \leq 4$ solid



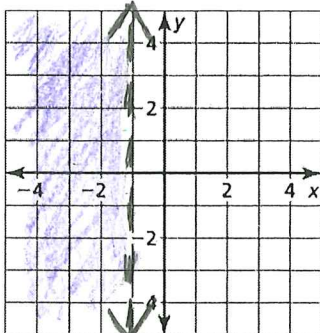
$y > 4$ cannot = 4 dash the line



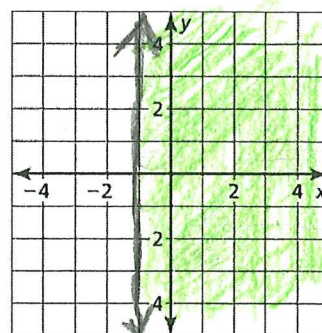
4. $x = -1$



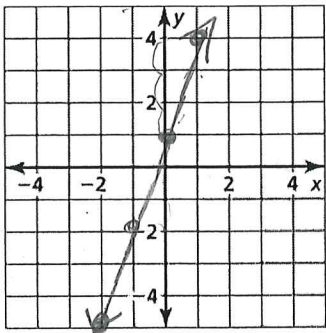
$x < -1$ dashed



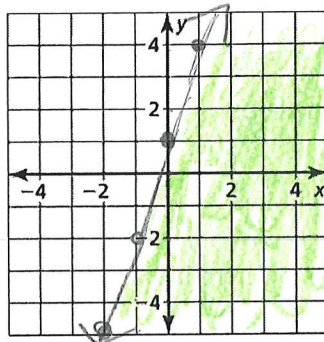
$x \geq -1$ solid



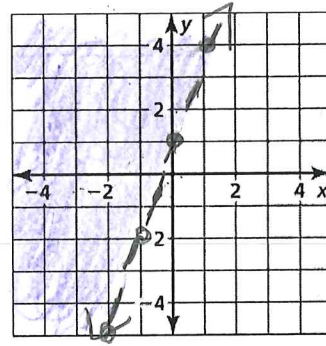
5. $y = 3x + 1$
 slope $\frac{3}{1}$
 y-int.



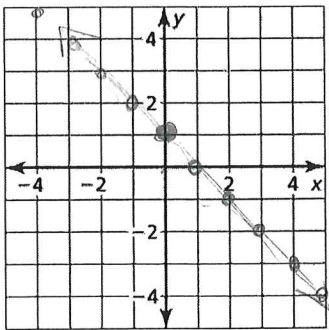
Test use $(0, 0)$
 $0 \leq 3(0) + 1$
 $0 \leq 1$ YES
 $y \leq 3x + 1$



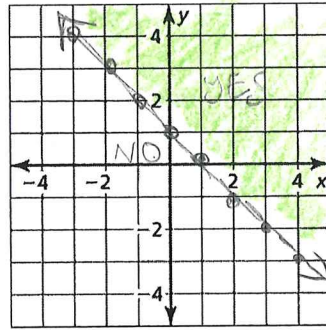
Test use $(0, 0)$
 $0 > 3(0) + 1$
 $0 > 1$ NO
 $y > 3x + 1$ dashed



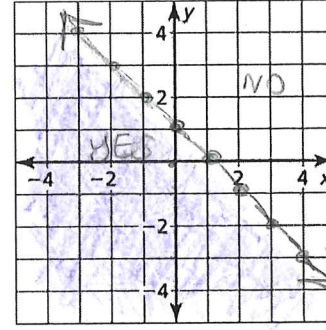
6. $y = -x + 1$
 slope -1



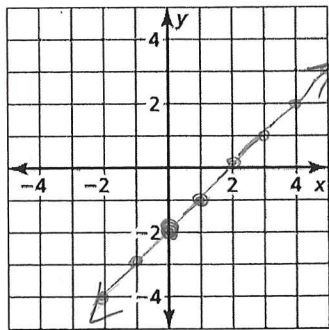
solid Test $(0, 0)$
 $0 \geq -0 + 1$
 $0 \geq 1$ NO
 $y \geq -x + 1$



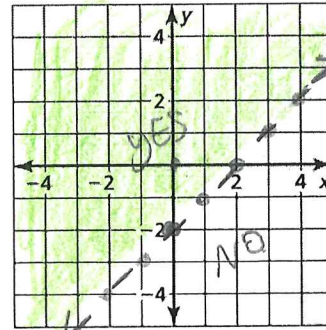
solid Test $(0, 0)$
 $0 \leq -0 + 1$
 $0 \leq 1$ YES
 $y \leq -x + 1$



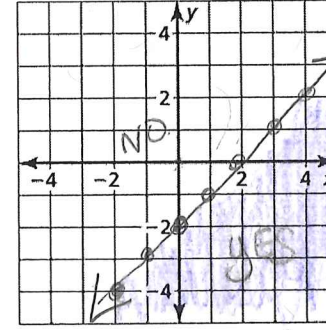
7. $x - y = 2$
 Get $y = mx + b$



dashed
 $x - y < 2$



solid
 $x - y \geq 2$



$$\begin{array}{r} x - y = 2 \\ -x \quad \quad -x \\ \hline -y = -x + 2 \\ \frac{-y}{-1} = \frac{-x}{-1} + \frac{2}{-1} \\ y = x - 2 \end{array}$$

$y = x - 2$
 slope: 1; -2 y-int

Test $(0, 0)$
 $x - y < 2$
 $0 - 0 < 2$
 $0 < 2$
 YES

Test $(0, 0)$
 $x - y \geq 2$
 $0 - 0 \geq 2$
 $0 \geq 2$
 NO