

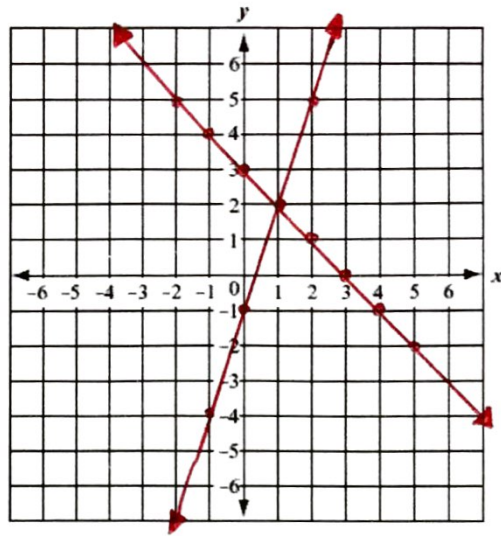
**Systems of Equations and Inequalities Practice**

1. Solve the system by graphing

$$y = 3x - 1$$

$$y = -x + 3$$

(1, 2)

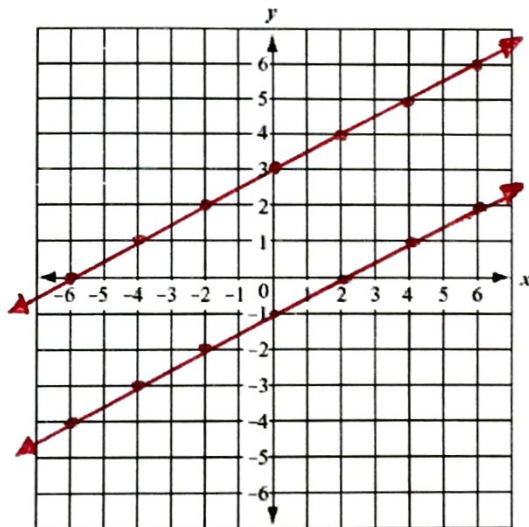


2. Solve the system by graphing

$$-x + 2y = -2 \quad 2y = x - 2$$

$$y = \frac{1}{2}x + 3 \quad y = \frac{1}{2}x - 1$$

No solution



Solve each system by substitution.

3.  $\begin{cases} y = 3x + 11 \\ y = -2x + 1 \end{cases}$

$$3x + 11 = -2x + 1$$

$$5x + 11 = 1$$

$$5x = -10$$

$$x = -2$$

Back substitution

$$y = 3(-2) + 11$$

$$y = -6 + 11$$

$$y = 5$$

(-2, 5)

$$4. \quad \begin{aligned} 4x - y &= -12 & \rightarrow & -y = -12 - 4x \\ -6x + 5y &= -3 & & y = 12 + 4x \end{aligned}$$

$$\begin{aligned} -6x + 5(12 + 4x) &= -3 \\ -6x + 60 + 20x &= -3 \\ 60 + 14x &= -3 \\ 14x &= -63 \\ x &= 4.5 \end{aligned}$$

Back Sub

$$\begin{aligned} y &= 12 + 4(4.5) \\ y &= 12 + 18 \\ y &= 30 \end{aligned}$$

$(4.5, 30)$

$$5. \quad \begin{aligned} y &= 5x - 8 \\ 5y &= 2x + 6 \end{aligned}$$

$$\begin{aligned} 5(5x - 8) &= 2x + 6 \\ 25x - 40 &= 2x + 6 \\ 23x &= 46 \\ x &= 2 \end{aligned}$$

Back Sub

$$\begin{aligned} y &= 5(2) - 8 \\ y &= 10 - 8 \\ y &= 2 \end{aligned}$$

$(2, 2)$

Solve each system using elimination.

$$6. \quad \begin{aligned} y &= -3x + 5 & \rightarrow & -1(3x + y = 5) & \rightarrow & -3x - y = -5 \\ y &= -4x - 1 & & 4x + y = -1 & & 4x + y = -1 \end{aligned}$$

Back Sub

$$\begin{aligned} y &= -4(-6) - 1 \\ &= 24 - 1 = 23 \end{aligned}$$

$(-6, 23)$

$$7. \quad \begin{aligned} 2x - 3y &= 5 & \rightarrow & 2x - 3y = 5 \\ -2(x + 2y) &= -1 & \rightarrow & -2x - 4y = 2 \end{aligned}$$

$$\begin{aligned} -7y &= 7 \\ y &= -1 \end{aligned}$$

$$\begin{aligned} 2x - 3(-1) &= 5 \\ 2x + 3 &= 5 \\ 2x &= 2 \\ x &= 1 \end{aligned}$$

$(1, -1)$

$$8. \quad \begin{aligned} -2(x + 4y) &= 12 & \rightarrow & -2x - 8y = -24 \\ 2x - 3y &= 2 & \rightarrow & 2x - 3y = 2 \end{aligned}$$

$$\begin{aligned} -11y &= -22 \\ y &= 2 \end{aligned}$$

$$\begin{aligned} 2x - 3(2) &= 2 \\ 2x - 6 &= 2 \\ 2x &= 8 \\ x &= 4 \end{aligned}$$

$(4, 2)$

$$9. \begin{aligned} 3x - 3y &= 3 \\ x &= y + 1 \end{aligned}$$

$$3(y+1) - 3y = 3$$

$$3y + 3 - 3y = 3$$

$$3 = 3$$

Infinitely many solutions

Graph each inequality.

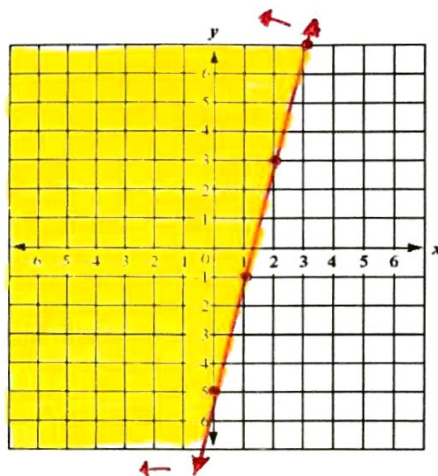
$$10. y \geq 4x - 5$$

Test (0,0)

$$0 \geq 4(0) - 5$$

$$0 \geq -5$$

True



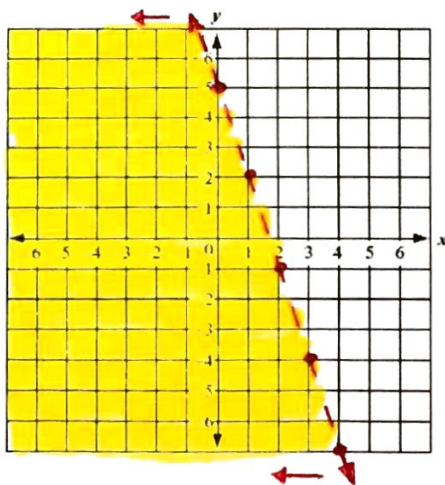
$$11. y < -3x + 5$$

Test (0,0)

$$0 < -3(0) + 5$$

$$0 < 5$$

True

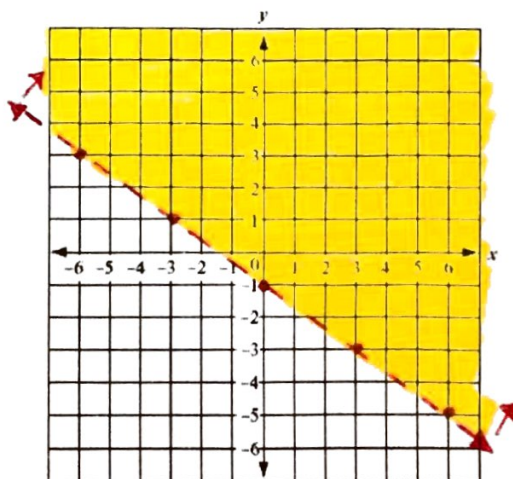


$$12. y > -\frac{2}{3}x - 1$$

Test (0,0)

$$0 > -1$$

True



13.  $y < 2x + 4$   
 $-3x - 2y \geq 6$

Test (0,0)  
 $0 < 4$   
 True

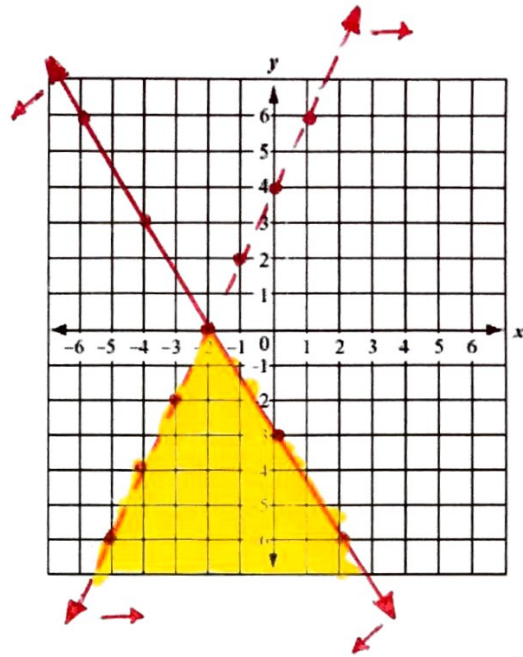
$-2y \geq 3x + 6$

$y \leq \frac{-3x - 6}{2}$

Test (0,0)

$0 \leq -3$

False



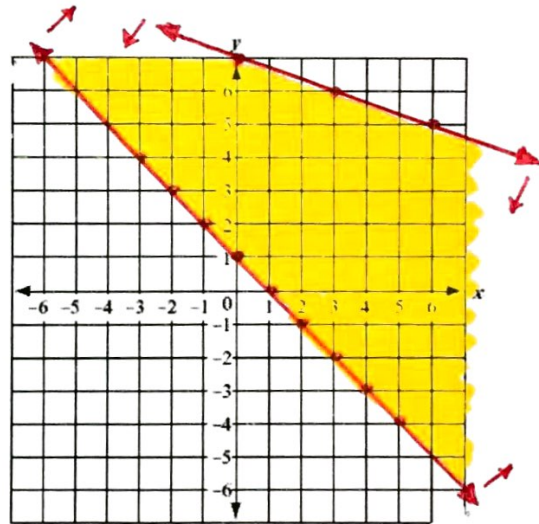
14.  $y \leq -\frac{1}{3}x + 7$   
 $y \geq -x + 1$

Test (0,0)  
 $0 \leq 7$  True

Test (0,0)

$0 \geq 1$

False



Bonus

Write the inequality that has the solution described.

The point (7, 12) and (-3, -8) lie on the boundary line, but neither point is a solution. The point (1, 1) is also a solution.

$m = \frac{-8 - 12}{-3 - 7} = \frac{-20}{-10} = 2$

$y - 12 = 2(x - 7)$

$y = 2x - 14 + 12$

$y = 2x - 2$

Test (1,1)

$1 \square 2(1) - 2$

$1 > 0$

$y > 2x - 2$