

Example 1 Solve each system of equations by multiplying. Check the answers by graphing the systems of equations.

(A)
$$\begin{cases} 3x + 8y = 7 \\ 2x - 2y = -10 \end{cases}$$

Multiply the second equation by 4.

$$4(2x - 2y = -10) \Rightarrow 8x - 8y = -40$$

Add the result to the first equation.

$$\begin{array}{r} 3x + 8y = 7 \\ + 8x - 8y = -40 \\ \hline 11x = -33 \end{array}$$

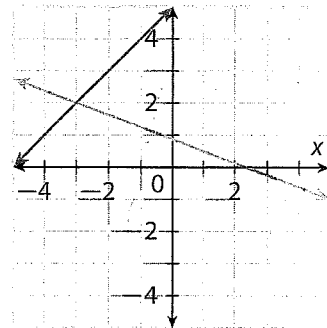
Solve for x .

$$11x = -33$$

$$x = -3$$

Substitute -3 for x in one of the original equations, and solve for y .

$$\begin{array}{r} 3x + 8y = 7 \\ 3(-3) + 8y = 7 \\ -9 + 8y = 7 \\ 8y = 16 \\ y = 2 \end{array}$$



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The solution to the system is $(-3, 2)$.

LCM = 26

(B)
$$\begin{cases} -3x + 2y = 4 \\ 4x - 13y = 5 \end{cases}$$

Multiply the first equation by 13 and multiply the second equation by 2 so the x terms in the system have coefficients of -12 and 12 respectively.

$$\begin{array}{r} 13(-3x + 2y = 4) \Rightarrow -12x + \quad y = \quad \\ 2(4x - 13y = 5) \Rightarrow 12x - \quad y = \quad \end{array}$$

Add the resulting equations.

$$\begin{array}{r} -12x + \quad y = \quad \\ +12x - \quad y = \quad \\ \hline \quad y = \quad \end{array}$$

Solve for y .

$$\begin{array}{r} \quad y = \quad \\ \quad y = \quad \end{array}$$

Handwritten work for system (B):

$$\begin{cases} (-3x + 2y = 4) \cdot 13 \\ (4x - 13y = 5) \cdot 2 \end{cases}$$

$$\begin{array}{r} -39x + 26y = 52 \\ 8x - 26y = 10 \\ \hline -31x = 62 \\ \hline x = -2 \end{array}$$

$$\begin{array}{r} 6 + 2y = 4 \\ -6 \quad -6 \\ \hline 2y = -2 \\ y = -1 \end{array}$$

Final solution: $x = -2, y = -1$

Solve the first equation for x when $y =$

$$-3x + 2y = 4$$

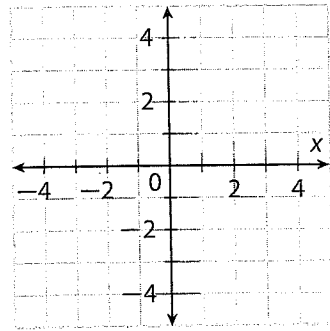
$$-3x + 2(\text{input}) = 4$$

$$-3x + \text{input} = 4$$

$$-3x =$$

$$x =$$

The solution to the system is



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Your Turn

Solve each system of equations by multiplying. Check the answers by graphing the systems of equations.

4.
$$\begin{cases} -3x + 4y = 12 \\ 2x + y = -8 \end{cases}$$

$(-4, 0)$

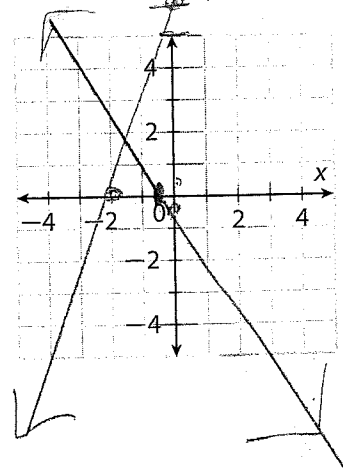
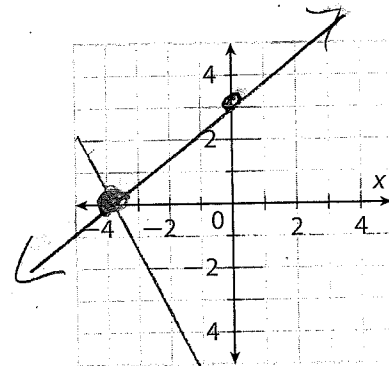
$$\begin{array}{r} -3(-4) + 4y = 12 \\ 12 + 4y = 12 \\ \underline{-12} \quad \underline{-12} \\ 4y = 0 \\ \frac{4y}{4} = \frac{0}{4} \end{array}$$

5.
$$\begin{cases} 2x + 3y = -1 \\ 5x - 2y = -12 \end{cases}$$

$(-2, 1)$

$$\begin{array}{r} 4x + 6y = -2 \\ 15x - 6y = -36 \\ \hline 19x = -38 \\ x = -2 \end{array}$$

$$\begin{array}{r} 2x + 3y = -1 \\ -4 + 3y = -1 \\ \underline{+4} \quad \underline{+4} \\ 3y = 3 \\ y = 1 \end{array}$$



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Ignore Directions

For each linear system, multiply the first equation by 2 and add the new equation to the second equation. Then, graph this new equation along with both of the original equations.

5.
$$\begin{cases} 2x + 4y = 24 \\ -12x + 8y = -16 \end{cases}$$

LCM = 6

6.
$$\begin{cases} (2x + 2y = 16) \cdot 3 \\ (-15x + 3y = -12) \cdot 2 \end{cases}$$

$$\begin{array}{r} 4 + 2y = 16 \\ -4 \quad \quad -4 \\ \hline 2y = 12 \end{array} \quad y = 6$$

$$\begin{array}{r} 6x + 6y = 48 \\ 30x - 6y = 24 \\ \hline 36x = 72 \\ x = 2 \end{array}$$

