

- 3. (1, 6)
- 6. (12, 6)
- 9. (-1, 2)
- 12. (0, -10)
- 13. (4, 5)
- 14. (-3, 1)
- 16. (-15, -62)
- 18. (-6, -1)
- 21. (4, -3)

Warm-up!

Solve the following systems of equations:

$$x + y = -22$$

$$x - y = 4$$

$$18. \begin{array}{l} 2x - y = -11 \\ \boxed{y = -2x - 13} \\ +2x \quad +2x \end{array}$$

$$\begin{array}{r} 2x - y = -11 \\ + 2x + y = -13 \\ \hline 4x = -24 \\ \frac{4x}{4} = \frac{-24}{4} \\ x = -6 \end{array} \quad \begin{array}{l} y = -2(-6) - 13 \\ y = 12 - 13 \\ y = -1 \end{array}$$

(-6, -1)

$$21. \begin{array}{r} -5x + y = -23 \\ -y = 3x - 9 \\ -3x \quad -3x \end{array}$$

$$\begin{array}{r} -5x + y = -23 \\ -3x - y = -9 \\ \hline -8x = -32 \\ \frac{-8x}{-8} = \frac{-32}{-8} \\ x = 4 \end{array}$$

$$\begin{array}{l} -y = 3(4) - 9 \\ -y = 12 - 9 \\ -y = 3 \\ \frac{-y}{-1} = \frac{3}{-1} \\ y = -3 \end{array}$$

(4, -3)

$$9. \begin{array}{l} x + y = 1 \\ (-1) \quad -2x + y = 4 \quad (-1) \end{array}$$

$$\begin{array}{r} x + y = 1 \\ 2x - y = -4 \\ \hline 3x = -3 \\ \frac{3x}{3} = \frac{-3}{3} \\ x = -1 \end{array} \quad \boxed{(-1, 2)}$$

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

$$3. \begin{array}{r} x + 2y = 13 \\ -x + y = 5 \\ \hline 3y = 18 \\ \frac{3y}{3} = \frac{18}{3} \\ y = 6 \end{array} \rightarrow \begin{array}{r} x + 2(6) = 13 \\ x + 12 = 13 \\ -12 \quad -12 \\ \hline x = 1 \end{array}$$

(1, 6)

## 6.4 Solve Linear Systems by Multiplying First



**Before**

You solved linear systems by adding or subtracting.

**Now**

You will solve linear systems by multiplying first.

**Why**

So you can solve a problem about preparing food, as in Ex. 39.

**GOAL:** Solve systems of linear equations exactly and approximately.

What's different today??

Today we will be doing the same thing as last week, but with a twist! For instance, could we solve the following system?

$$\overbrace{(-2)} \quad 3x - 4y = 7 \quad \overbrace{(-2)}$$

$$6x - 5y = 20 \quad \longrightarrow \quad 6x - 5(2) = 20$$

$$-6x + 8y = -14$$

$$6x - 5y = 20$$

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$$\frac{3y}{3} = \frac{6}{3}$$

$$y = 2$$

$$\begin{array}{r} 6x - 10 = 20 \\ +10 \quad +10 \\ \hline 6x = 30 \\ \frac{6x}{6} = \frac{30}{6} \end{array}$$

$$(5, 2)$$

## Example 2!

Solve the following system of equations:

$$24x + 15y = 20$$

$$(-6) \quad 4x + 3y = 5 \quad (-6)$$

$$\begin{array}{r} 24x + 15y = 20 \\ -24x - 18y = -30 \\ \hline -3y = -10 \\ \frac{-3y}{-3} = \frac{-10}{-3} \end{array}$$

$$y = \frac{10}{3}$$

$$\left( -\frac{5}{4}, \frac{10}{3} \right)$$

$$\begin{array}{r} 4x + 3\left(\frac{10}{3}\right) = 5 \\ 4x + 10 = 5 \\ -10 \quad -10 \\ \hline 4x = -5 \\ x = -\frac{5}{4} \end{array}$$

Example 3-What now???

$$(4) \quad -3m + 2n = 6 \quad (4)$$

$$(3) \quad 4m + 5n = -31 \quad (3)$$

$$-12m + 8n = 24$$

$$12m + 15n = -93$$


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$$\frac{23n = 69}{23} \quad \frac{23}{23}$$

$$n = -3$$

$$(-4, -3)$$

$$-3m + 2(-3) = 6$$

$$-3m - 6 = 6$$


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$$\frac{-3m = 12}{-3} \quad \frac{12}{-3}$$

$$m = -4$$

Example 4: Same Thing!

$$-8y + 7x = 1$$

$$\begin{cases} (-7) 6x - 7y = 1 & (-7) \\ (6) 7x - 8y = 1 & (6) \end{cases}$$

$$-42x + 49y = -7$$

$$42x - 48y = 6$$

$$y = -1$$

$$\boxed{\begin{pmatrix} -1 & -1 \\ | & | \end{pmatrix}}$$

$$\rightarrow -8(-1) + 7x = 1$$

$$8 + 7x = 1$$

$$\begin{array}{r} -8 \quad -8 \\ \hline \end{array}$$

$$\frac{7x}{7} = \frac{-7}{7}$$

$$x = -1$$

Homework 6.4:  
Pages 396-397, # 3-7, 10-13