

## Warm Up

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Solve for x, showing your thinking:

$$\frac{4}{1} \left[ \frac{1}{4} x = 5 \right]$$
$$x = 20$$

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$$\frac{5}{1} \left[ \frac{1}{5} x + \frac{2}{7} = 0 \right]$$
$$x + \frac{10}{7} = 0$$
$$\begin{array}{r} -\frac{10}{7} \\ \hline x = -\frac{10}{7} \end{array}$$

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$$\frac{2}{3} x = 4$$
$$\frac{\frac{3}{2}}{\frac{3}{2}} \quad \frac{2}{3}$$
$$x = 6$$

$$\left(\frac{3}{2}\right) \frac{2}{3} x = \frac{4}{1} \left(\frac{3}{2}\right)$$
$$x = 6$$

The reciprocal of  $\frac{2}{3}$ .

Any number multiplied by its reciprocal equals 1.

$$\begin{aligned} \#9 \quad -4x + y &= 6 \rightarrow y = 4x + 6 \\ -5x - y &= 21 \end{aligned}$$

$$-5x - 1(4x + 6) = 21$$

$$-5x - 4x - 6 = 21$$

$$\begin{array}{r} -9x - 6 = 21 \\ +6 \quad +6 \\ \hline \end{array}$$

$$\begin{array}{r} -9x = 27 \\ \frac{-9}{-9} \quad \frac{27}{-9} \\ \hline \end{array}$$

$$x = -3$$

$$\begin{aligned} \#10 \quad -5x + y &= -3 \\ 3x - 8y &= 24 \end{aligned} \quad \begin{array}{r} -5x + y = -3 \\ +5x \quad +5x \\ \hline y = 5x - 3 \end{array}$$

$$3x - 8(5x - 3) = 24$$

$$3x - 40x + 24 = 24$$

$$-37x + 24 = 24$$

$$\begin{array}{r} -37x + 24 = 24 \\ -24 \quad -24 \\ \hline \end{array}$$

$$-37x = 0$$

$$\begin{array}{r} -37x = 0 \\ \frac{-37}{-37} \quad \frac{0}{-37} \\ \hline \end{array}$$

$$x = 0$$

Yes, zero is  
a number!!

$$\begin{aligned} -5x + y &= -3 \\ -5(0) + y &= -3 \\ y &= -3 \end{aligned} \quad (0, -3)$$

## 2.2 Taco Truck Lunch

### Solving Systems by Combining Equations I

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In Problem 2.1, you developed strategies for solving systems of equations by writing each equation in the equivalent form  $y = mx + b$  or  $x = ny + c$ . Then you found the solution of the system by graphing or by solving one linear equation for  $x$  or  $y$ .

In this Problem, you will learn another strategy for solving linear systems.

Pablo and Jasmine each took their brothers out for lunch. They stopped at a taco truck where the prices were not posted.



After placing their orders, they compared what they bought with the total cost for each order.

Pablo and his brother got 6 tacos and 2 drinks for \$9.

- Can you use this information to find the price of one taco? Of one drink? Explain.

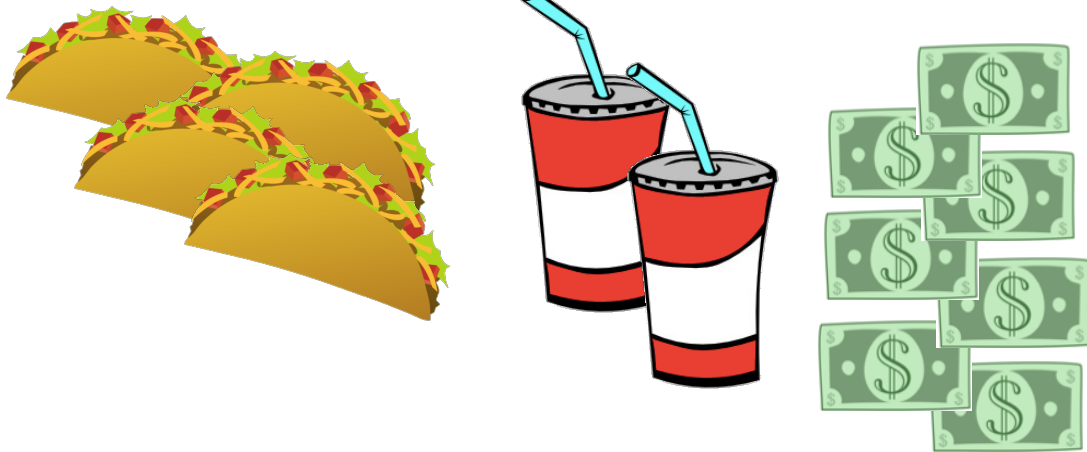


After placing their orders, they compared what they bought with the total cost for each order.

Pablo and his brother got 6 tacos and 2 drinks for \$9.

Jasmine and her brother got 4 tacos and 2 drinks for \$7.

- Does the additional information help you find the price of one taco? Of one drink? Explain.



## Problem 2.2

- A** Pablo's younger brother Pedro used the orders and total prices to find the price of each taco and each drink.

When asked how he figured out the prices, Pedro said, "It's kind of like what we did in school with coins and pouches." Then he made the following sketch.



1. How does the sketch help you find the price of one taco and the price of one drink?
2. Find another way to use Pedro's sketch to solve the problem.

$$\text{T} + \text{T} = \$\$$$

$$\text{T} = \$$$

$$\begin{array}{r}
 6\text{T} + 2\text{D} = 9 \\
 4\text{T} + 2\text{D} = 7 \\
 \hline
 \end{array}$$

$$\frac{2\text{T}}{2} = \frac{2}{2}$$

$$\text{T} = 1$$

$$6(1) + 2\text{D} = 9$$

$$\begin{array}{r}
 6 + 2\text{D} = 9 \\
 -6 \quad -6 \\
 \hline
 \end{array}$$

$$\frac{2\text{D} = 3}{2} \quad \frac{3}{2}$$

$$\text{D} = 1.50$$

**Problem 2.2** *continued*

**B** Pablo and Jasmine had just started studying systems of linear equations in algebra. They looked at Pedro's drawing and said, "We could write that as a system of equations."

1. Write an equation that represents the cost of Pablo's order and one that represents the cost of Jasmine's order. Use  $t$  for the price of each taco and  $d$  for the price of each drink.
2. What operations with the equations from part (1) match your way of using Pedro's sketch to find the prices  $t$  and  $d$ ? Why do the operations make sense?

**C** In algebra class the next day, Pablo and Jasmine tried to solve the system of linear equations.  $\begin{cases} x + 4y = 11 \\ x + y = 5 \end{cases}$

1. How could they represent the system with a sketch similar to the one Pedro drew of the taco truck orders?
2. How could the sketch and reasoning about the equations lead them to a solution of the system?

**D** Use diagrams or reasoning about equations to solve each system.

1.  $\begin{cases} 3x + y = 4 \\ x + y = 5 \end{cases}$

2.  $\begin{cases} 3x + 2y = 4 \\ x + 2y = 6 \end{cases}$

$$\begin{array}{r}
 c. \quad x + 4y = 11 \\
 - \quad x + y = 5 \\
 \hline
 \quad \quad 3y = 6 \\
 \quad \quad \frac{3}{3} = \frac{6}{3} \\
 \quad \quad y = 2
 \end{array}$$

$$\begin{array}{r}
 x + 4y = 11 \\
 x + 4(2) = 11 \\
 x + 8 = 11 \\
 - 8 \quad - 8 \\
 \hline
 x = 3
 \end{array}$$

# Homework

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