

2-5

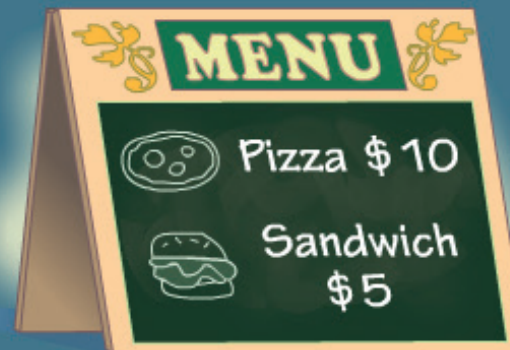
## Literal Equations and Formulas

**OBJECTIVE:** I can rewrite and use literal equations and formulas



With the person sitting next to you, discuss the problem provided and document your response

You are ordering pizzas and sandwiches. You have a budget of \$80. How many sandwiches can you buy if you buy 4 pizzas? 5 pizzas? Explain your answer.



## Essential Understanding

**Essential Understanding** When you work with literal equations, you can use the methods you have learned in this chapter to isolate any particular variable.



## Example

### #1 Rewriting a Literal Equation

The equation  $10x + 5y = 80$ , where  $x$  is the number of pizzas and  $y$  is the number of sandwiches, models the problem in the warm up. How many sandwiches can you buy if you buy 3 pizzas? 6 pizzas?



## Your Turn to Work it Out



1. Solve the equation  $4 = 2m - 5n$  for  $m$ . What are the values of  $m$  when  $n = -2, 0,$  and  $2$ ?

## Example

### #2 Rewriting a Literal Equation With Only Variables



What equation do you get when you solve  $ax - bx = c$  for  $x$ ?

## Your Turn to Work it Out




2. What equation do you get when you solve  $-t = r + px$  for  $x$ ?

## Concept Understanding



A **formula** is an equation that states a relationship among quantities. Formulas are special types of literal equations. Some common formulas are given below. Notice that some of the formulas use the same variables, but the definitions of the variables are different.



Formulas		
Formula Name	Formula	Definitions of Variables
Perimeter of a rectangle	$P = 2\ell + 2w$	$P$ = perimeter, $\ell$ = length, $w$ = width
Circumference of a circle	$C = 2\pi r$	$C$ = circumference, $r$ = radius
Area of a rectangle	$A = \ell w$	$A$ = area, $\ell$ = length, $w$ = width
Area of a triangle	$A = \frac{1}{2}bh$	$A$ = area, $b$ = base, $h$ = height
Area of a circle	$A = \pi r^2$	$A$ = area, $r$ = radius
Distance traveled	$d = rt$	$d$ = distance, $r$ = rate, $t$ = time
Temperature	$C = \frac{5}{9}(F - 32)$	$C$ = degrees Celsius, $F$ = degrees Fahrenheit

## Example

### #3 Rewriting a Geometric Formula



What is the radius of a circle with circumference 64 ft? Round to the nearest tenth.  
Use 3.14 for  $\pi$ .



## Your Turn to Work it Out



3. What is the height of a triangle that has an area of  $24 \text{ in.}^2$  and a base with a length of 8 in.?

## Example

### #4 Rewriting a Formula

**Biology** The monarch butterfly is the only butterfly that migrates annually north and south. The distance that a particular group of monarch butterflies travels is shown. It takes a typical butterfly about 120 days to travel one way. What is the average rate at which a butterfly travels in miles per day? Round to the nearest mile per day.



## Your Turn to Work it Out



4. Pacific gray whales migrate annually from the waters near Alaska to the waters near Baja California, Mexico, and back. The whales travel a distance of about 5000 mi each way at an average rate of 91 mi per day. About how many days does it take the whales to migrate one way?