

VOLUME 2

A detailed illustration of a humanoid robot with a red and orange metallic body, blue accents, and a helmet-like head. The robot is standing on a sleek, silver, metallic surfboard, riding a large, curling blue wave. The robot's right arm is extended forward, and its left arm is slightly bent. The background shows a city skyline with various skyscrapers under a bright, hazy sky. The overall scene is dynamic and futuristic.

**enVision** Mathematics




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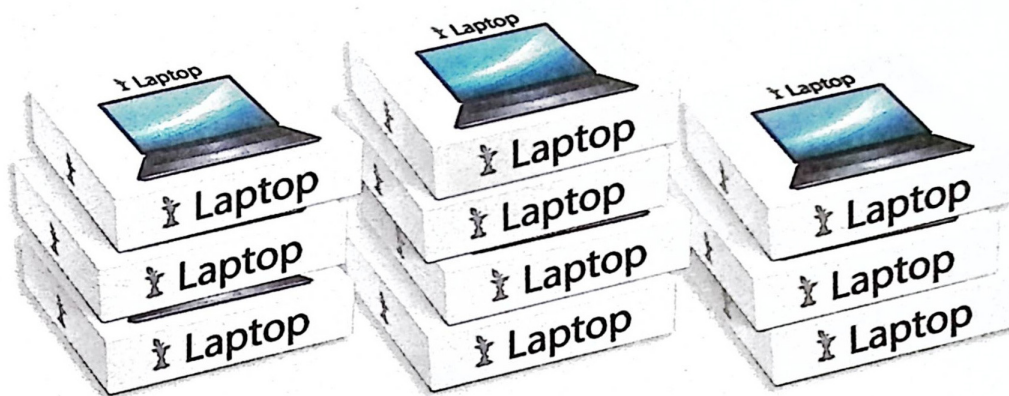




## Explore It!



A superintendent orders the new laptops shown below for two schools in her district. She receives a bill for \$7,500.



**A.** Draw a representation to show the relationship between the number of laptops and the total cost.

**B.** Use the representation to write an equation that can be used to determine the cost of one laptop.

## Lesson 7-1

### Combine Like Terms to Solve Equations



Go Online

### I can...

solve equations that have like terms on one side.

## Focus on math practices

**Reasoning** Why is it important to know that each laptop costs the same amount?



# **Essential Question** How do you solve equations that contain like terms?

## **EXAMPLE 1**



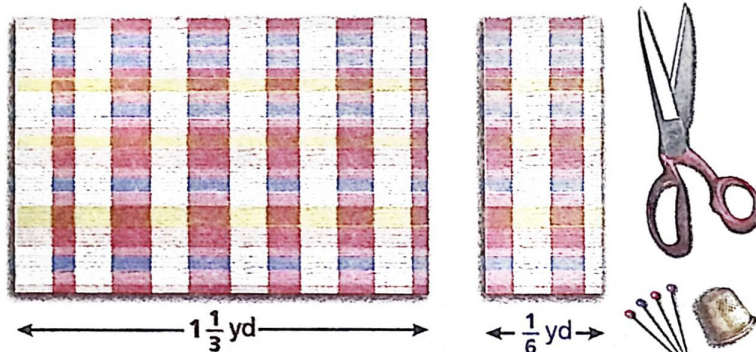
## **Combine Like Terms to Solve Addition Equations**

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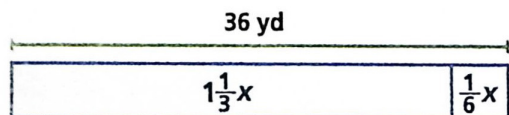


Gianna has 36 yards of fabric to make sets of matching placemats and napkins. How many matching sets can she make?

**Look for Relationships** Why can you use the same variable to represent the number of placements and to represent the number of napkins?



Draw a bar diagram to show how the quantities are related.



Yards of fabric needed to make  $x$  placemats

Yards of fabric needed to make  $x$  napkins

Use the diagram to write and solve an equation.

$$1\frac{1}{3}x + \frac{1}{6}x = 36$$

$$\frac{8}{6}x + \frac{1}{6}x = 36$$

$$\frac{9}{6}x = 36$$

$$\frac{6}{9} \cdot \left(\frac{9}{6}\right)x = \frac{6}{9} \cdot (36)$$

$$x = 24$$

Combine like terms.

Gianna has enough fabric to make 24 matching sets of placemats and napkins.

## **Try It!**

Selena spends \$53.94 to buy a necklace and bracelet set for each of her friends. Each necklace costs \$9.99, and each bracelet costs \$7.99. How many necklace and bracelet sets,  $s$ , did Selena buy?

Selena buys necklace and bracelet sets for  friends.

$$\boxed{\phantom{00}}s + \boxed{\phantom{00}}s = 53.94$$

$$\boxed{\phantom{00}}s = 53.94$$

$$s = \boxed{\phantom{00}}$$

**Convince Me!** Suppose the equation is  $9.99s + 7.99s + 4.6 = 53.94$ . Can you combine the  $s$  terms and 4.6? Explain.



**EXAMPLE 2****Combine Like Terms to Solve Subtraction Equations**

ACTIVITY

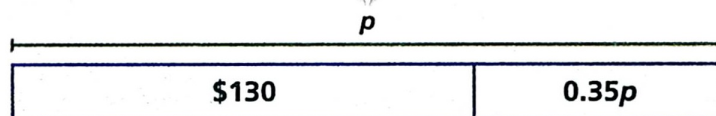


ASSESS

Selene bought a computer screen on sale for 35% off the original price. What was the price of the computer screen before the sale?

Draw a bar diagram to represent the situation.

Let  $p$  be the price of the screen before the sale.



Use the bar diagram to write an equation. Then solve.

$$p - 0.35p = 130$$

$$0.65p = 130$$

Combine like terms.

$$\frac{0.65p}{0.65} = \frac{130}{0.65}$$

$$p = 200$$

**Look for Relationships** How do the original price and the sale price relate?

The price of the computer screen before the sale was \$200.

**Try It!**

Nat's grocery bill was \$150, which included a 5% club discount. What was Nat's bill before the discount? Write and solve an equation.

**EXAMPLE 3****Combine Like Terms with Negative Coefficients to Solve Equations**

Solve the equation  $-3.5y - 6.2y = -87.3$ .

$$-3.5y - 6.2y = -87.3$$

$$-9.7y = -87.3$$

$$\frac{-9.7y}{-9.7} = \frac{-87.3}{-9.7}$$

$$y = 9$$

To combine like terms with negative coefficients, use the rules that you learned for adding and subtracting rational numbers.

**Try It!**

Solve for  $d$ .

a.  $-\frac{1}{4}d - \frac{2}{5}d = 39$

b.  $-9.76d - (-12.81d) = 8.54$



In an equation with variable terms on one side, you can combine like terms before using inverse operations and properties of equality to solve the equation.

$$0.8n + 0.6n = 42$$

$$1.4n = 42$$

Combine like terms.

$$\frac{1.4n}{1.4} = \frac{42}{1.4}$$

$$n = 30$$

## Do You Understand?

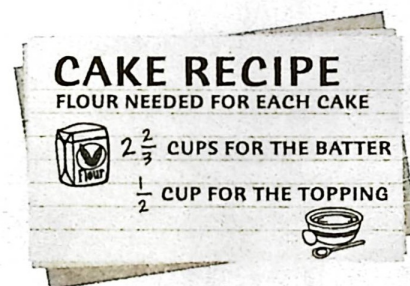
1. **Essential Question** How do you solve equations that contain like terms?

2. **Look for Relationships** How do you recognize when an equation has like terms?

3. **Make Sense and Persevere** In the equation  $0.75s - \frac{5}{8}s = 44$ , how do you combine the like terms?

## Do You Know How?

4. Henry is following the recipe card to make a cake. He has 95 cups of flour. How many cakes can Henry make?



5. A city has a population of 350,000. The population has decreased by 30% in the past ten years. What was the population of the city ten years ago?

6. Solve the equation  $-12.2z - 13.4z = -179.2$ .





# Practice & Problem Solving

Scan for  
Multimedia**Leveled Practice** In 7 and 8, complete the steps to solve for  $x$ .

7.  $\frac{4}{5}x - \frac{1}{4}x = 11$

$$\frac{\boxed{\phantom{00}}}{20}x = 11$$

$$\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} \left( \frac{\boxed{\phantom{00}}}{20}x \right) = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} (11)$$

$$x = \boxed{\phantom{00}}$$

8.  $-0.65x + 0.45x = 5.4$

$$\boxed{\phantom{00}}x = 5.4$$

$$x = \frac{5.4}{\boxed{\phantom{00}}}$$

$$x = \boxed{\phantom{00}}$$

In 9–12, solve for  $x$ .

9.  $\frac{4}{9}x + \frac{1}{5}x = 87$

10.  $-3.8x - 5.9x = 223.1$

11.  $x + 0.15x = 3.45$

12.  $-\frac{3}{5}x - \frac{7}{10}x + \frac{1}{2}x = -56$

- 13.** A contractor buys 8.2 square feet of sheet metal. She used 2.1 square feet so far and has \$183 worth of sheet metal remaining. Write and solve an equation to find out how much sheet metal costs per square foot.

- 14. Make Sense and Persevere** Clint prepares and sells trail mixes at his store. This week, he uses  $\frac{3}{8}$  of his supply of raisins to make regular trail mix and  $\frac{1}{4}$  of his supply to make spicy trail mix. If Clint uses 20 pounds of raisins this week, how many pounds of raisins did he have at the beginning of the week?

- 15. Make Sense and Persevere** A submarine descends to  $\frac{1}{6}$  of its maximum depth. Then it descends another  $\frac{2}{3}$  of its maximum depth. If it is now at 650 feet below sea level, what is its maximum depth?

