

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Warm Up

1. $1 + bx + bx - 1 + x^2$

6. $-az + z - z^2 + 3z + z$

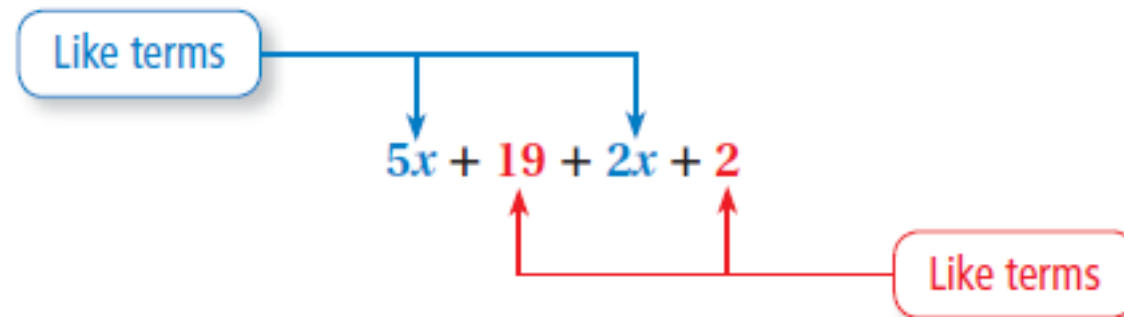
2. $-x + v^2 + v^2 - 1 - 1$

7. $y + c + 1 - y - y$

3. $-2 + u - uy - 1 + 3$

8. $6 + 6 + z - 4uz - 1$

In an algebraic expression, **like terms** are terms that have the same variables raised to the same exponents. Constant terms are also like terms.



Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Warm Up Answers

$$\begin{aligned} 1. \quad & 1 + bx + bx - 1 + x^2 \\ & = 2bx + x^2 \end{aligned}$$

$$\begin{aligned} 6. \quad & -az + z - z^2 + 3z + z \\ & = -az - z^2 + 5z \end{aligned}$$

$$\begin{aligned} 2. \quad & -x + v^2 + v^2 - 1 - 1 \\ & = 2v^2 - x - 2 \end{aligned}$$

$$\begin{aligned} 7. \quad & y + c + 1 - y - y \\ & = -y + c + 1 \end{aligned}$$

$$\begin{aligned} 3. \quad & -2 + u - uy - 1 + 3 \\ & = -uy + u \end{aligned}$$

$$\begin{aligned} 8. \quad & 6 + 6 + z - 4uz - 1 \\ & = -4uz + z + 11 \end{aligned}$$

Lesson 5.6

January 19 & 20, 2016

Essential Question:

How can you use mental math to find the percent of a number?

Lesson Objective:

Students will be able to:

use multiplication to find the percent of a number
and division to find the whole given the part and
the percent.

Self-Evaluation Scale

Score	Description
4	I can teach other students how to use multiplication to find the percent of a number and division to find the whole given the part and the percent.
3	I can use multiplication to find the percent of a number and division to find the whole given the part and the percent.
2	I recognize, but still need help to use multiplication to find the percent of a number and division to find the whole given the part and the percent.
1	I do not know how to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Activity 1 & 2

Work with a partner on Activity 1, 2, 3 & 4 on page 117 & 118 of your (soft cover) Record and Practice Journal.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

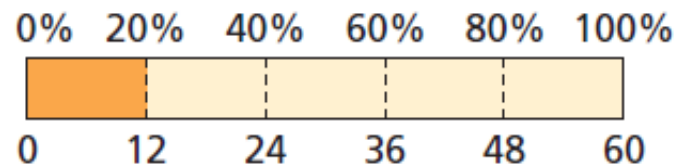
Key Idea

Finding the Percent of a Number

Words Write the percent as a fraction. Then multiply by the whole.
The percent times the whole equals the part.

Numbers 20% of 60 is 12.
 $\frac{1}{5} \times 60 = 12$

Model



Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

1

Finding the Percent of a Number

25% of 40 is what number?

$$25\% \text{ of } 40 = \frac{1}{4} \cdot 40$$

$$= \frac{1 \cdot \overset{10}{\cancel{40}}}{\underset{4}{\cancel{4}}}$$

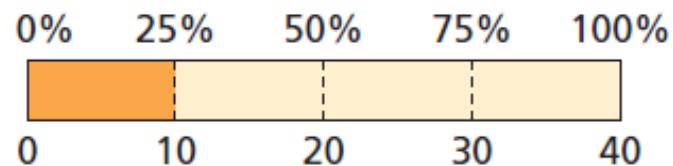
$$= 10$$

Write the percent as a fraction and multiply.

Divide out the common factor.

Simplify.

••• So, 25% of 40 is 10.



You can also use a ratio table to find the percent of a number.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

2

Finding the Percent of a Number Using a Ratio Table

60% of 150 is what number?

Use a ratio table to find the part. Let one row be the *part*, and let the other be the *whole*. Find an equivalent ratio with 150 as the whole.

The first column represents the percent.

$$\frac{\text{part}}{\text{whole}} = \frac{60}{100} = 60\%$$

Part	60	30	90
Whole	100	50	150

$\div 2$ $\times 3$

$\div 2$ $\times 3$

So, 60% of 150 is 90.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

You can use a related division equation to find the whole given the part and the percent.

Key Idea

Finding the Whole

Write the percent as a fraction. Then divide the part by the fraction.

Words The part divided by the percent equals the whole.

Numbers 20% of 60 is 12.

$$\frac{1}{5} \times 60 = 12 \longrightarrow 12 \div \frac{1}{5} = 60$$

Multiplication equation

Related division equation

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

3 Finding the Whole

75% of what number is 48?

$$48 \div 75\% = 48 \div \frac{3}{4}$$

$$= 48 \cdot \frac{4}{3}$$

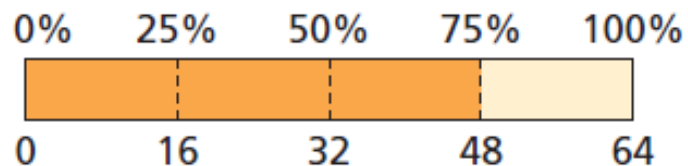
$$= 64$$

Write the percent as a fraction and divide.

Multiply by the reciprocal.

Simplify.

••• So, 75% of 64 is 48.



Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

4 Finding the Whole Using a Ratio Table

120% of what number is 72?

Use a ratio table to find the whole. Find an equivalent ratio with 72 as the part.

The first column represents the percent.

$$\frac{\text{part}}{\text{whole}} = \frac{120}{100} = 120\%$$

Part	120	6	72
Whole	100	5	60

$\div 20$ $\times 12$
 $\div 20$ $\times 12$

So, 120% of 60 is 72.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

5 Real-Life Application

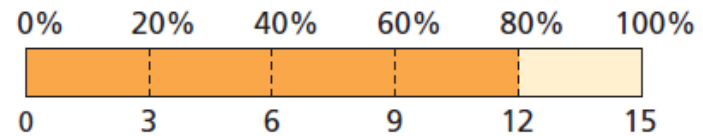
The width of a rectangular room is 80% of its length. What is the area of the room?

Find 80% of 15 feet.



15 ft

$$\begin{aligned} 80\% \text{ of } 15 &= \frac{4}{5} \times 15 \\ &= \frac{4 \times \overset{3}{\cancel{15}}}{\underset{1}{\cancel{5}}} \\ &= 12 \end{aligned}$$



The width is 12 feet.

Use the formula for the area A of a rectangle.

$$A = 15 \times 12 = 180$$

So, the area of the room is 180 square feet.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

6 Real-Life Application



Winning bid: **US \$120.00**
Time remaining: **0 sec**

You win an online auction for concert tickets. Your winning bid is 60% of your maximum bid. How much more were you willing to pay for the tickets than you actually paid?

- (A) \$72 (B) \$80 (C) \$120 (D) \$200

Your maximum bid is the *whole*, and your winning bid is the *part*. Find your maximum bid by dividing the part by the percent.

$$120 \div 60\% = 120 \div \frac{3}{5} \quad \text{Divide the part by the percent.}$$

$$= 120 \cdot \frac{5}{3} \quad \text{Multiply by the reciprocal.}$$

$$= 200 \quad \text{Simplify.}$$

Your maximum bid is \$200, and your winning bid is \$120. So, you were willing to pay $200 - 120 = \$80$ more for the tickets.

❖ The correct answer is (B).

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Assignment

Complete problems:

4, 8, 16, 20, 26, 28, 32, 34, 40, 50, & 52

on pages 229 - 231 in your Big Ideas Text Book.

Learning Objective: Students will be able to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Assignment Answers

4. 4

8. 3

16. 8.36

20. 39.6

26. a. \$3.15
b. \$48.15

28. 90

32. 20

34. 20

40. 75 pounds

50. yes; To pass inspection, the ball must bounce back to between 68% and 75% of the starting height, or between 4.08 feet and 4.5 feet. It bounced back to $4.08\bar{3}$ feet, so it passes.

Lesson 5.6

January 19 & 20, 2016

Essential Question:

How can you use mental math to find the percent of a number?

Lesson Objective:

Students will be able to:

use multiplication to find the percent of a number
and division to find the whole given the part and
the percent.

Self-Evaluation Scale

Score	Description
4	I can teach other students how to use multiplication to find the percent of a number and division to find the whole given the part and the percent.
3	I can use multiplication to find the percent of a number and division to find the whole given the part and the percent.
2	I recognize, but still need help to use multiplication to find the percent of a number and division to find the whole given the part and the percent.
1	I do not know how to use multiplication to find the percent of a number and division to find the whole given the part and the percent.

Learning Objective: Students will be able to make ratio tables and use them to solve problems.

Homework

In your Big Ideas Record and Practice Journal
page I20.