

# 6-6 Percent of Change

Warm Up

Problem of the Day

Lesson Presentation

Lesson Quizzes

# 6-6 Percent of Change

## Warm Up

Solve using proportion formula.

$$\begin{array}{l} \text{Part} \longrightarrow \underline{\%} \\ \text{Total} \longrightarrow 100 \end{array} = \begin{array}{l} \underline{\text{is}} \longleftarrow \text{Part} \\ \text{of} \longleftarrow \text{Total} \end{array}$$

1. 10% of what number is 6?    60
2. What percent of 20 is 8?    40%
3. What is 80% of 60?    48
4. 50 is what percent of 200?    25%

## 6-6 Percent of Change

### Problem of the Day

A pair of \$100 sneakers was on sale for 50% off. Then the store manager marked them down another 30%. She then discounted the price by 20%. What is the total discount as a percent of the original price?

**72%**

## 6-6 Percent of Change

*Learn* to solve problems involving percent of change.

# 6-6 Percent of Change

## Vocabulary

percent of change

percent of increase

percent of decrease

## 6-6 Percent of Change

A percent can be used to describe an amount of change. The **percent of change** is the amount, stated as a percent, that a number increases or decreases. If the amount goes up, it is a **percent of increase**. If the amount goes down, it is a **percent of decrease**.

# 6-6 Percent of Change

How to solve for amount of change:

## Helpful Hint

When a number is **decreased**, **subtract** the **new** amount **from** the **original** amount to find the **amount of change**.

Decreased common terms: discounted or sale price

## Helpful Hint

When a number is **increased**, **subtract** the **original** amount **from** the **new** amount to find the **amount of change**.

Increased common terms: wholesale=original price and new=retail price

## 6-6 Percent of Change

Two methods for solving percent of change:

A. Proportion Method Formula.

$$\frac{\%}{100} = \frac{\text{amount of change}}{\text{original amount}}$$

B. Equation Method Formula:

$$\text{Percent of change} = \frac{\text{amount of change}}{\text{original amount}} * 100$$

# 6-6 Percent of Change

## Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

65 is **decreased** to 38. **What percent of 65 is amount of change?**

Proportion Method.

$$65 - 38 = 27 \quad \text{STEP 1: Find the amount of change.}$$

$$\frac{n}{100} = \frac{27}{65} \quad \text{STEP 2: Substitute into proportion.}$$

$$n \cdot 65 = 100 \cdot 27 \quad \text{Set the cross products equal.}$$

$$\frac{65n}{65} = \frac{2,700}{65} \quad \text{Multiply. Divide each side by 65 to isolate the variable.}$$

$$n \approx 41.53846\% \quad \text{Write as a percent.}$$

$$n \approx 41.5\% \quad \text{Round once in percent form.}$$

The percent of decrease is about 41.5%.

## 6-6 Percent of Change

### Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

65 is **decreased** to 38.

Equation Method.

$$65 - 38 = 27 \quad \text{STEP 1: Find the amount of change.}$$

$$\text{percent of change} = \frac{27}{65} * 100 \quad \text{STEP 2: Substitute values into Formula and divide.}$$

$$\approx 0.4153846 * 100 \quad \text{Multiply by 100.}$$

$$\approx 41.53846\% \quad \text{Write as a percent. Round once in percent form.}$$
$$\approx 41.5\%$$

The percent of decrease is about 41.5%.

# 6-6 Percent of Change

## Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

70 is **decreased** to 45. **What percent of 70 is amount of change?**

Proportion Method.

$$70 - 45 = 25$$

STEP 1: Find the amount of change.

$$\frac{n}{100} = \frac{25}{70}$$

STEP 2: Substitute into proportion.

$$n \cdot 70 = 100 \cdot 25$$
 Set the cross products equal.

$$\frac{70n}{70} = \frac{2,500}{70}$$

Multiply. Divide each side by 65 to isolate the variable.

$$n \approx 35.5714\%$$
 Write as a percent.

$$n \approx 35.6\%$$
 Round once in percent form.

The percent of decrease is about 41.5%.

## 6-6 Percent of Change

### Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

70 is **decreased** to 45

Equation Method.

$$70 - 45 = 25 \quad \text{STEP 1: Find the amount of change.}$$

$$\text{percent of change} = \frac{25}{70} * 100 \quad \text{STEP 2: Substitute values into Formula and divide.}$$

$$\approx 0.35714 * 100 \quad \text{Multiply by 100.}$$

$$\begin{aligned} &\approx 35.5714\% \\ &\approx 35.6\% \end{aligned} \quad \text{Write as a percent. Round once in percent form.}$$

The percent of decrease is about 35.6%.

# 6-6 Percent of Change

## Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

37 is **increased** to 56. **What percent of 37 is amount of change?**

Proportion Method.

$$56 - 37 = 19$$

STEP 1: Find the amount of change.

$$\frac{n}{100} = \frac{19}{37}$$

STEP 2: Substitute into proportion.

$$n \cdot 37 = 100 \cdot 19$$
 Set the cross products equal.

$$\frac{37n}{37} = \frac{1,900}{37}$$
 Multiply. Divide each side by 37 to isolate the variable.

$$n \approx 51.351\%$$
 Write as a percent.

$$n \approx 51.4\%$$
 Round once in percent form.

The percent of increase is about 51.4%.

## 6-6 Percent of Change

### Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

37 is **increased** to 56.

Equation Method.

$$56 - 37 = 19 \quad \text{STEP 1: Find the amount of change.}$$

$$\text{percent of change} = \frac{19}{37} * 100 \quad \text{STEP 2: Substitute values into Formula and divide.}$$

$$\approx 0.51351 * 100 \quad \text{Multiply by 100.}$$

$$\begin{aligned} &\approx 51.351\% \\ &\approx 51.4\% \end{aligned} \quad \text{Write as a percent. Round once in percent form.}$$

The percent of increase is about 51.4%.

# 6-6 Percent of Change

## Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

41 is **increased** to 92. **What percent of 41 is amount of change?**

Proportion Method.

$$92 - 41 = 51 \quad \text{STEP 1: Find the amount of change.}$$

$$\frac{n}{100} = \frac{51}{41} \quad \text{STEP 2: Substitute into proportion.}$$

$$n \cdot 41 = 100 \cdot 51 \quad \text{Set the cross products equal.}$$

$$\frac{41n}{41} = \frac{5,100}{41} \quad \text{Multiply. Divide each side by 41 to isolate the variable.}$$

$$n \approx 124.39\% \quad \text{Write as a percent.}$$

$$n \approx 124.4\% \quad \text{Round once in percent form.}$$

The percent of increase is about 124.4%

## 6-6 Percent of Change

### Additional Example 1A: Finding Percent of Change

Find the percent of change. Round answers to the nearest tenth of a percent, if necessary.

41 is **increased** to 92.

Equation Method.

$$92 - 41 = 51 \quad \text{STEP 1: Find the amount of change.}$$

$$\text{percent of change} = \frac{51}{41} * 100 \quad \text{STEP 2: Substitute values into Formula and divide.}$$

$$\approx 1.2439 * 100 \quad \text{Multiply by 100.}$$

$$\begin{aligned} &\approx 124.39\% \\ &\approx 124.4\% \end{aligned} \quad \text{Write as a percent. Round once in percent form.}$$

The percent of increase is about 124.4%.

## 6-6 Percent of Change

Practice:

TB pg. 360 #1-10 – skip #5&6

# 6-6 Percent of Change

## Proportion Method.

### Steps to solve for sales price

(scenario: Original Price given and percent off or discounted)

**Step 1:** set up proportion to solve for **amount of discount**

$$\frac{\%}{100} = \frac{\text{amount of discount}}{\text{original amount}}$$

**Step 2:** Subtract **amount of discount** from **original price** = sales price

**PRICE is LOWERED (on sale)**

# 6-6 Percent of Change

## Additional Example 2: Using Percent of Change

The regular price of a bicycle helmet is \$42.99. It is on sale for 20% off. What is the sales price? *Think: 20% of \$42.99 is what number?*

### Proportion Method.

Step 1: Set-up proportion to find the amount of the discount  $d$ .

$$\frac{20}{100} = \frac{d}{42.99} \qquad \frac{\%}{100} = \frac{\text{is (amount of discount)}}{\text{of (original price)}}$$

$$100 \cdot d = 20 \cdot 42.99 \qquad \text{Set the cross products equal.}$$

$$\frac{100d}{100} = \frac{859.8}{100} \qquad \text{Multiply.}$$

$$d = 8.598 \qquad \text{Divide each side by 100 to isolate the variable.}$$

$$d \approx \$8.60 \qquad \text{Round to the nearest cent.}$$

The amount of the discount is \$8.60.

# 6-6 Percent of Change

## Additional Example 2 Continued

**The regular price of a bicycle helmet is \$42.99. It is on sale for 20% off. What is the sales price?**

Step 2: Find the sale price.

$$\begin{array}{r r r r r} \text{regular price} & - & \text{amount of discount} & = & \text{sales price} \\ \$42.99 & - & \$8.60 & = & \$34.39 \end{array}$$

The sale price is \$34.39

# 6-6 Percent of Change

## Additional Example 2: Using Percent of Change

The regular price of a computer game is \$49.88. It is on sale for 15% off. What is the sales price?

Think: 15% of \$49.98 is what number?

### Proportion Method.

Step 1: Set-up proportion to find the amount of the discount  $d$ .

$$\frac{15}{100} = \frac{d}{49.98} \qquad \frac{\%}{100} = \frac{\text{is (amount of discount)}}{\text{of (original price)}}$$

$$100 \cdot d = 15 \cdot 49.98 \qquad \text{Set the cross products equal.}$$

$$\frac{100d}{100} = \frac{748.2}{100} \qquad \text{Multiply.}$$

$$d = 7.482 \qquad \text{Divide each side by 100 to isolate the variable.}$$

$$d \approx \$7.48 \qquad \text{Round to the nearest cent.}$$

The amount of the discount is \$7.48 .

# 6-6 Percent of Change

## Check It Out: Example 2 Continued

The regular price of a computer game is \$49.88. It is on sale for 15% off. What is the sales price?

Step 2: Find the sale price.

regular price – amount of discount = sales price

$$\$49.88 - \$7.48 = \$42.40$$

The sale price is \$42.40.

## 6-6 Percent of Change

When you know the percent of change, you can use an equation to find the actual amount of change.

# 6-6 Percent of Change

## Proportion Method.

**Steps to solve for retail price/selling price**  
(scenario: Original Price given and percent off or discounted)

**Step 1:** set up proportion to solve for **amount of increase**

$$\frac{\%}{100} = \frac{\text{amount of increase}}{\text{original amount (wholesale)}}$$

**Step 2:** Add **amount of increase** to **original price** = retail price

**PRICE is INCREASED (for profit)**

# 6-6 Percent of Change

## Additional Example 3: *Business Application*

A boutique buys hand-painted T-shirts for \$12.60 each and sells them at a 110% increase in price.

What is the retail price of the T-shirts?

**Proportion Method.** Think: 110% of \$12.60 is what number?

**Step 1:** Set-up proportion to find the amount of the discount  $d$ .

$$\frac{110}{100} = \frac{d}{12.60} \quad \frac{\%}{100} = \frac{\text{is (amount of discount)}}{\text{of (original price)}}$$

$$100 \cdot d = 110 \cdot 12.60 \quad \text{Set the cross products equal.}$$

$$\frac{100d}{100} = \frac{1386}{100} \quad \text{Multiply.}$$

$$d = \frac{1386}{100} \quad \text{Divide each side by 100 to isolate the variable.}$$

$$d = 13.86$$

$$d = \$13.86 \quad \text{Round to the nearest cent.}$$

**Step 2:** Find the selling price.

$$\text{wholesale price} + \text{amount of increase} = \text{retail price}$$

$$\$12.60 + \$13.86 = \$26.46$$

The retail price of the hand-painted T-shirts is \$26.46 each.

# 6-6 Percent of Change

## Check It Out: Example 3

William makes T-shirts for \$7.00 each and sells them after a price increase of 125%. What is the retail price of the T-shirts?

**Proportion Method.** Think: 125% of \$7.00 is what number?

**Step 1:** Set-up proportion to find the amount of the discount  $d$ .

$$\frac{125}{100} = \frac{d}{7.00} \quad \frac{\%}{100} = \frac{\text{is (amount of discount)}}{\text{of (original price)}}$$

$$100 \cdot d = 125 \cdot 7.00 \quad \text{Set the cross products equal.}$$

$$\frac{100d}{100} = \frac{875}{100} \quad \text{Multiply.}$$

$$d = 8.75 \quad \text{Divide each side by 100 to isolate the variable.}$$

$$d = 8.75$$

$$d = \$8.75 \quad \text{Round to the nearest cent.}$$

**Step 2:** Find the selling price.

$$\text{wholesale price} + \text{amount of increase} = \text{retail price}$$

$$\$7.00 + \$8.75 = \$15.75$$

The retail price of the T-shirts is \$15.75 each.