

Chapter 2 Extension Lesson #3: PERCENT OF CHANGE

You purchase a pair of shoes that originally cost \$40 for only \$30.

a) How much did you save?

$$\$40 - \$30 = \boxed{\$10}$$

b) Change your answer from part (a) to a percent (money saved/original cost).

$$\frac{10}{40} = .25 = \boxed{25\%}$$

Finding the percent of change is using the **ratio** of the **amount of change** to the **original amount**.

Example 1 $\frac{\text{change}}{\text{original}} = \frac{p}{100}$ $\frac{\text{change}}{\text{original}} = \text{dec} \rightarrow \%$

A retailer changed the price of ballpoint pens from \$0.40 to \$0.45 each. What was the percent of change? Is this a percent of **increase** or decrease?

$$\begin{aligned} \text{change} &= .05 \\ \text{original} &= .40 \end{aligned}$$

$$\begin{aligned} \frac{.05}{.40} &= \frac{p}{100} \\ .40p &= (.05)(100) \\ \frac{.40p}{.40} &= \frac{5}{.40} \\ \boxed{p} &= \boxed{12.5\%} \end{aligned}$$

% of increase

Example 2

A pair of pants that originally cost \$40 are now on sale for \$28. Find the percent of change. Is this a percent of increase or decrease?

$$\text{change: } \$40 - \$28 = \$12$$

% of decrease

$$\text{original: } \$40$$

$$\frac{\$12}{\$40} = \frac{p}{100}$$

$$\frac{40p}{40} = \frac{1200}{40}$$

$$p = 30\%$$

Sometimes an increase or decrease is given as a percent, rather than an amount.

Two applications of percent of change are

discounts and sales tax.

price
↓
decreases

price
↓
increases

Example 3

Amy bought a television that had an original price of \$600. Because she worked at the store, she received a 15% discount. What was the discounted price?

\$600 original

$p = 15$

$$\begin{array}{r} 600 \\ - 90 \\ \hline \end{array}$$

$$\boxed{\$510 = \text{discounted price}}$$

$$\frac{x}{600} = \frac{15}{100}$$

$$\frac{100x}{100} = \frac{9000}{100}$$

$$x = 90$$

change/discount

$$15\% = .15$$

$$\begin{array}{r} 600 \\ \times .15 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 600 \\ - 90 \\ \hline \end{array}$$

$$\boxed{\$510}$$

Example 4

Luke wants to purchase a new TI-84 graphing calculator at Staples. It costs \$130, and there is a sale for 25% off. What is the price that Luke will pay?

\$130 original
25 p

$$\frac{X}{130} = \frac{25}{100}$$

$$\frac{100x}{100} = \frac{3250}{100}$$

$$x = 32.5$$

↓
change/
discount

$$\begin{array}{r} \$130.00 \\ - 32.50 \\ \hline \end{array}$$

\$97.50

Example 5

Tim bought a pair of running shoes for \$75. There was a 6% sales tax. Find the tax and the total price that Tim paid.

\$75 original
6 p

$$\frac{X}{75} = \frac{6}{100}$$

$$\frac{100x}{100} = \frac{450}{100}$$

$$x = 4.5$$

↑
change/
tax

$$\begin{array}{r} \$75.00 \\ + 4.50 \\ \hline \end{array}$$

\$79.50 = total price
\$4.50 = tax

Example 6

Allie is purchasing a new laptop that originally costs \$599. She is getting a 15% student discount and has to pay a 7% sales tax.

What is the total price?

discount

$$\frac{X}{599} \begin{matrix} \nearrow 15 \\ \searrow 100 \end{matrix}$$

$$\frac{100X}{100} = \frac{8985}{100}$$

$$X = 89.85$$

discount

$$\begin{array}{r} \$599.00 \\ - 89.85 \\ \hline \$509.15 \end{array}$$

disc. price

sales tax

$$\frac{X}{509.15} \begin{matrix} \nearrow 7 \\ \searrow 100 \end{matrix}$$

$$\frac{100X}{100} = \frac{3564.05}{100}$$

$$X = 35.6405$$

tax

$$\begin{array}{r} \$509.15 \\ + 35.64 \\ \hline \boxed{\$544.79} \end{array}$$

Example 7

$$100\% + 25\% = 125\%$$

25% markup

Old Navy prices their clothes 25% above the wholesale price. If the retail price of a jacket is \$49, what was the wholesale price?

store pays you pay

$$\frac{\text{retail}}{\text{wholesale}} = \frac{125}{100} \text{ we pay} \longrightarrow \frac{49}{X} \begin{matrix} \nearrow 125 \\ \searrow 100 \end{matrix}$$

$$\frac{125X}{125} = \frac{4900}{125}$$

$$X = \$39.20 \leftarrow \text{wholesale price}$$

Example 8

$18\% + 100\% = 118\%$

A store owner marks her goods 18% above the wholesale price. If the retail price of an item is \$28.60, what is the item's wholesale price?

$$\frac{\text{retail}}{\text{wholesale}} = \frac{\text{markup}}{100}$$

$$\frac{28.60}{x} = \frac{118}{100}$$

$$\frac{118x}{118} = \frac{2860}{118}$$

$x = 24.237\dots$

$\$24.24 \leftarrow \text{wholesale}$

Example 9

$\text{markup } 100\% + 75\%$

A college newspaper increased its sales by 75% when it ran an issue featuring the star quarterback. Before this issue, 10% of the school's 800 students bought the paper. How many students bought the issue featuring the football player?

How many originally bought the paper?

$$800 \cdot .10 \quad \text{or} \quad \frac{x}{800} = \frac{10}{100}$$

80 people

$$\frac{x}{80} = \frac{175}{100}$$

$$\frac{100x}{100} = \frac{14,000}{100}$$

$x = 140 \text{ students}$