

Prepare for Percents and Statistical Samples

- Look at the expressions and missing values in each box. Write a title for each box that represents what the expressions and missing values have in common. Then add at least two of your own examples to each box.

<u>25%</u>	<u>100</u>	<u>12</u>
$\frac{250}{1,000}$ $\frac{1}{4}$ 25 hundredths 0.2500 half of $\frac{1}{2}$ <u>25%</u> of 80 is 20. 5 is <u>25%</u> of 20. $\frac{15}{60}$ 1 is <u>25%</u> of 4	25% of 400 1.00×100 50% of 200 $\frac{200}{2}$ 1.00 is <u>100</u> %. 4% of <u>100</u> is 4. $\frac{1,000}{10}$ <u>100</u> is 20% of 500	50% of 24 $24 \times \frac{1}{2}$ 150% of 8 24% of 50 $\frac{2}{3}$ of 18 $\frac{1}{3}$ of <u>12</u> is 4. <u>12</u> is 15% of 80. $\frac{48}{4}$ 6 is 50% of <u>12</u>

Pick one given example from each box and explain how it represents your title. Then meet with a partner and compare your titles and examples.

Explore Percents

Previously, you learned how to find the percent of a number. In this lesson, you will learn about solving problems that involve percents.

► Use what you know to try to solve the problem below.

Last year, a middle school band had 80 students. This year, the band has 120% of that number of students. How many students are in the band this year?

Last Year's Middle School Band Students



 = 10 band students

TRY IT



Math Toolkit double number lines, grid paper, hundredths grids

$$100\% = 80$$

$$20\% = 16$$

$$80 + 16 = 96$$

$$\begin{array}{r} 16 \\ 5 \overline{)80} \\ \underline{-5} \\ 30 \end{array}$$

DISCUSS IT

Ask: How did you get started finding the number of students?

Share: I got started by ...



Learning Targets SMP 1, SMP 2, SMP 3, SMP 4, SMP 5, SMP 6, SMP 7, SMP 8

- Solve problems about simple interest.
- Solve percent problems involving markups, markdowns, tax, tips, and commission.
- Solve multi-step percent problems that include multiple percents.

CONNECT IT

- 1 **Look Back** How many students are in the band this year? How do you know?

96 members. I found 100% and 20% and then added those two groups of students to get my total.

- 2 **Look Ahead** You can think of 120% as $100\% + 20\%$. Similarly, you can think of 80% as $100\% - 20\%$. Many real-world situations involve calculations with percents. Percents are used to calculate **simple interest**. You can owe interest on a loan or earn interest on a bank account or investment.

Simple interest formula: $I = Prt$

The formula shows that the amount of interest, I , is based on the principal, P , the interest rate, r , and the time you borrow or invest the money for, t . The principal is the starting amount. The **rate** is a percent written as a decimal. For simple interest, **time** is often measured in years.

- a. Suppose you borrow \$300 at a yearly, or annual, simple interest rate of 3.4% for 3 years. What values would you use for P , r , and t ?

$$P = 300 \quad r = 0.034 \quad t = 3$$

- b. Suppose you borrow \$400 at a yearly simple interest rate of 3% for 3 months. What values would you use for P , r , and t ?

$$P = 400 \quad r = 0.03 \quad t = \frac{1}{4} \text{ or } 0.25$$

- c. A **markdown** decreases the cost of an item. A **markup** increases the cost. Suppose a store puts an item on sale for 25% off. Is that an example of a **markup** or a **markdown**? *Markdown*

- d. Often when you buy something, you pay a percent of the price as a **tax**. Suppose the total amount you pay for an item includes a 7% tax. What percent of the price of the item do you pay? 107% $(100\% \text{ (the item)} + 7\% \text{ (tax)}) = 107\%$

- e. Many people give tips, or **gratuities**, for good service. Many salespeople earn **commission** on their sales. Suppose Jason earns a 9% commission on a \$1,000 sale. How much is Jason's commission? $1000 \cdot 0.09 = 90.00$ \$90

- 3 **Reflect** Is it possible for a single price change to be both a markup and a markdown? Explain your thinking.

No, A markup is an increase and a markdown is a decrease, so one change cannot be both.