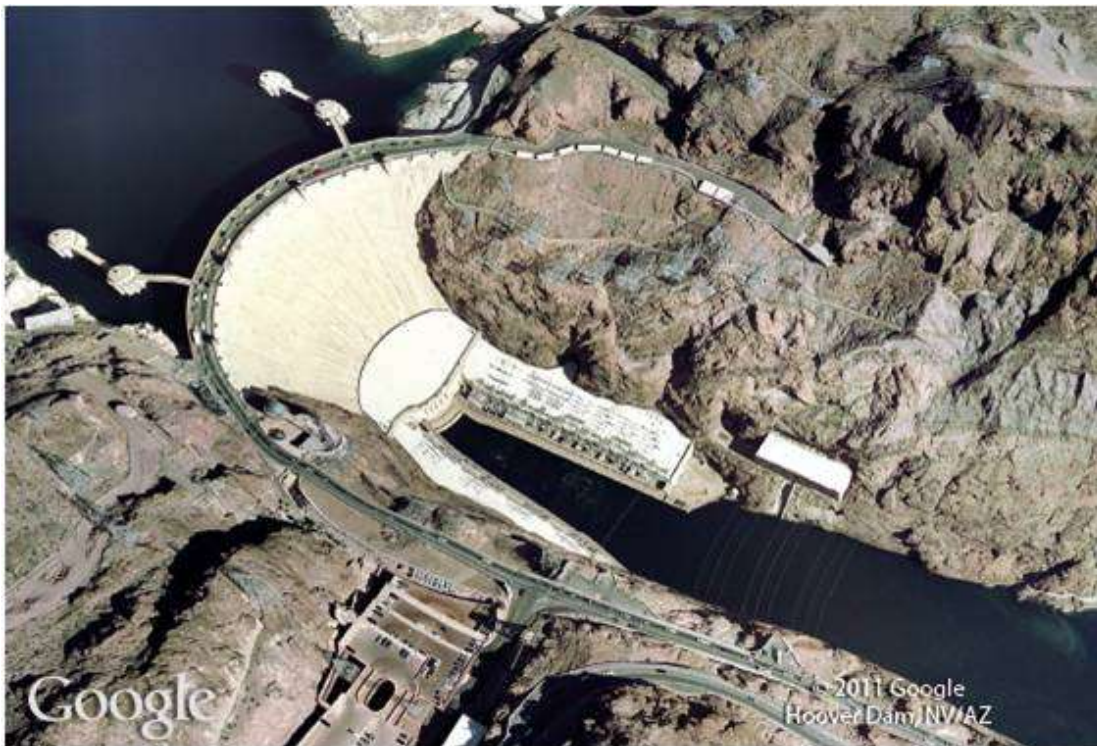


# Percent

7



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## SECTION 7.1

# Percents, Decimals, and Fractions

# Objectives

- A** Understand the meaning of percent.
- B** Change percents to decimals.
- C** Change decimals to percents.
- D** Change percents to fractions in lowest terms.
- E** Change fractions to percents.



## A The Meaning of Percent

# The Meaning of Percent

*Percent* means “per hundred.”

Writing a number as a percent is a way of comparing the number with 100. For example, the number 42% (the % symbol is read “percent”) is the same as 42 one-hundredths. That is,

$$42\% = \frac{42}{100}$$

Percents are really fractions (or ratios) with denominator 100.

Here are some examples that show the meaning of percent.

# Example 1

Write each number as an equivalent fraction without the % symbol.

**a.**  $50\% = \frac{50}{100}$

**b.**  $75\% = \frac{75}{100}$

**c.**  $25\% = \frac{25}{100}$

**d.**  $33\% = \frac{33}{100}$

# Example 1

cont'd

**e.**  $6\% = \frac{6}{100}$

**f.**  $160\% = \frac{160}{100}$



## **B** Changing Percents to Decimals



## Example 2

Change 35.2% to a decimal.

**Solution:**

We drop the % symbol and write 35.2 over 100.

$$35.2\% = \frac{35.2}{100}$$

Use the meaning of % to convert to a fraction with denominator 100.

$$= 0.352$$

Divide 35.2 by 100.

# Changing Percents to Decimals

We see from Example 2 that 35.2% is the same as the decimal 0.352.

The result is that the % symbol has been dropped and the decimal point has been moved two places to the *left*.

# Changing Percents to Decimals

Because % always means “per hundred,” we will always end up moving the decimal point two places to the left when we change percents to decimals.

Because of this, we can write the following rule.

## **Rule** Percent to Decimal

To change a percent to a decimal, drop the % symbol and move the decimal point two places to the *left*, inserting zeros as placeholders if needed.



## **c** Changing Decimals to Percents

# Changing Decimals to Percents

We want to change decimals to percents.

We know that 42% written as a decimal is 0.42, which means that in order to change 0.42 back to a percent, we must move the decimal point two places to the *right* and use the % symbol:

$$0.42 = 42\%$$

Notice that we don't show the new decimal point if it is at the end of the number.

## **Rule** Decimal to Percent

To change a decimal to a percent, we move the decimal point two places to the *right* and use the % symbol.

# Example 5

Write each decimal as a percent.

**a.**  $0.27 = 27\%$

**b.**  $4.89 = 489\%$

**c.**  $0.2 = 0.20 = 20\%$

Notice here that we put a 0 after the 2 so we can move the decimal point two places to the right.

**d.**  $0.09 = 9\% = 9\%$

Notice that we can drop the 0 at the left without changing the value of the number.

**e.**  $25 = 25.00 = 2,500\%$

Here we put two 0s after the 5 so that we can move the decimal point two places to the right.

# Changing Decimals to Percents

As you can see from the examples, percent is just a way of comparing numbers to 100.

To multiply decimals by 100, we move the decimal point two places to the right.

To divide by 100, we move the decimal point two places to the left.

Because of this, it is a fairly simple procedure to change percents to decimals and decimals to percents.



## **D** Changing Percents to Fractions

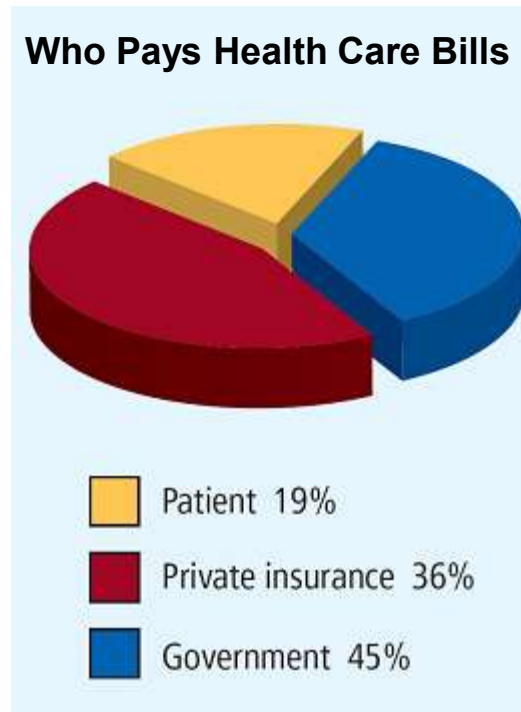


# Changing Percents to Fractions

To change a percent to a fraction, drop the % symbol and write the original number over 100.

# Example 7

The pie chart below shows who pays health care bills. Change each percent to a fraction.



## Example 7 – *Solution*

In each case, we drop the percent symbol and write the number over 100.

Then we reduce to lowest terms if possible.

$$19\% = \frac{19}{100}$$

$$45\% = \frac{45}{100} = \frac{9}{20}$$

↑  
Reduce.

$$36\% = \frac{36}{100} = \frac{9}{25}$$

↑  
Reduce.



## **E** Changing Fractions to Percents

# Changing Fractions to Percents

To change a fraction to a percent, we can change the fraction to a decimal and then change the decimal to a percent.

## Example 10

Suppose the price your bookstore pays for your textbook is  $\frac{7}{10}$  of the price you pay for your textbook. Write  $\frac{7}{10}$  as a percent.

**Solution:**

We can change  $\frac{7}{10}$  to a decimal by dividing 7 by 10:

$$\begin{array}{r} 0.7 \\ 10 \overline{)7.0} \\ \underline{7\ 0} \\ 0 \end{array}$$

## Example 10 – *Solution*

cont'd

We then change the decimal 0.7 to a percent by moving the decimal point two places to the *right* and using the % symbol:

$$0.7 = 70\%$$

# Changing Fractions to Percents

You may have noticed that we could have saved some time in Example 24 by simply writing  $\frac{7}{10}$  as an equivalent fraction with denominator 100.

That is:

$$\frac{7}{10} = \frac{7 \cdot \mathbf{10}}{10 \cdot \mathbf{10}} = \frac{70}{100} = 70\%$$

This is a good way to convert fractions like  $\frac{7}{10}$  to percents.

It works well for fractions with denominators of 2, 4, 5, 10, 20, 25, and 50, because they are easy to change to fractions with denominators of 100.