

CONSUMER MATHEMATICS 2

FRACTIONS, DECIMALS, AND PERCENT

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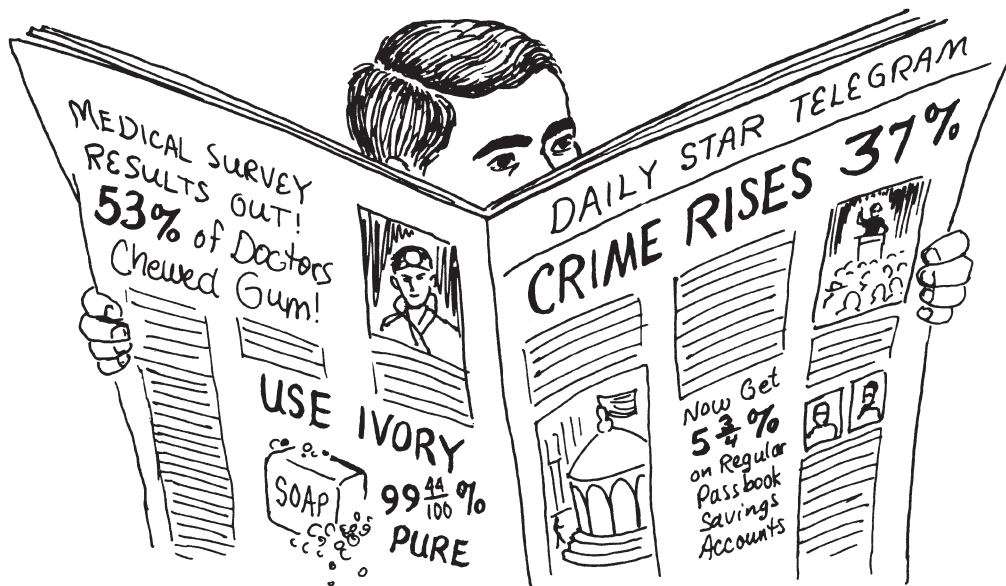
III. PERCENT

OBJECTIVES

Read these objectives. When you have completed this section, you will be able:

10. To change decimals and fractions to percents.
11. To change percents to decimals and fractions.
12. To work base-rate-percentage problems.
13. To solve consumer-related problems with percents.

You can hardly read the newspaper these days without encountering the symbol %. “Crime rises 37%.” “Ivory Soap— $99\frac{44}{100}\%$ pure.” “53% of the doctors surveyed chewed gum.”



This symbol, %, is read *percent*. It means “per hundred,” or “out of every hundred,” or “hundredths.”

DEFINITION

Percent means “per hundred,” “out of every hundred,” or “hundredths.”

For example, the statement, “61% of the voters approved the measure” means “61 voters per hundred approved,” or “61 voters out of every hundred approved,” or “61 hundredths of the voters approved.” You will learn how to work with this concept.

DECIMALS

To be able to calculate with percents, you need to be able to convert them to decimals. Conversion of percents to decimals is easy to do. Just drop the % sign and move the decimal point two places to the left.

Model: $37\% = 0.37$

This method is logical, since one meaning of % is hundredths, and 0.37 is 37 hundredths. You can remember this trick by thinking of the two little zeros on the % sign as decimal places. When you take the % sign away, you must get the two decimal places back by moving the decimal point to the left.

Change these percents to decimals.

- 3.1 $67\% =$ _____ 3.4 $0.4\% =$ _____
3.2 $3\% =$ _____ 3.5 $138.4\% =$ _____
3.3 $147\% =$ _____ 3.6 $14\% =$ _____

Of course, changing from a decimal to a percent is simply the same procedure in reverse. Move the decimal point two places to the right and add the % sign.

Model: $0.473 = 47.3\%$

Change these decimals to percents.

- 3.7 $0.43 =$ _____ 3.10 $0.7 =$ _____
3.8 $1.3 =$ _____ 3.11 $0.65 =$ _____
3.9 $0.01 =$ _____ 3.12 $0.04 =$ _____

Often you are concerned with a certain percent of something. The word *of* usually means to multiply. You change the % to a decimal before you multiply.

Model: $37\% \text{ of } 350 = 0.37 \times 350 = 129.5$

Find the following quantities.

- 3.13 $6\% \text{ of } 124 =$ _____
3.14 $103\% \text{ of } 19 =$ _____
3.15 $42.1\% \text{ of } 375.4 =$ _____

- 3.16 5.4% of 900 = _____
- 3.17 13% of 130 = _____
- 3.18 75.5% of 299.8 = _____

FRACTIONS

Occasionally, you want to change a percent to a common fraction. The easiest way is to change the percent to a decimal and then change the decimal to a common fraction. Remember how to make the change?

Model: $25\% = 0.25 = \frac{25}{100} = \frac{1}{4}$

If not, perhaps you should review the previous section.

Convert the following percents to decimals and then to common fractions.

- | | | | |
|------|---------------|------|---------------|
| 3.19 | 80% = _____ | 3.22 | 45% = _____ |
| 3.20 | 75% = _____ | 3.23 | 2% = _____ |
| 3.21 | 87.5% = _____ | 3.24 | 12.5% = _____ |

The process of converting a fraction to a percent is just the reverse, as you might suspect. First change the fraction to a decimal (remember?) and then convert the decimal to a percent.

Model: $\frac{1}{7} = 0.1429 = 14.29\%$

Convert the following fractions to decimals and then to percents. Round the decimals to three places before converting to percents.

- | | | | |
|------|------------------------|------|-----------------------|
| 3.25 | $\frac{1}{3} =$ _____ | 3.28 | $\frac{3}{5} =$ _____ |
| 3.26 | $\frac{9}{10} =$ _____ | 3.29 | $\frac{1}{2} =$ _____ |
| 3.27 | $\frac{1}{8} =$ _____ | 3.30 | $\frac{1}{7} =$ _____ |

CONSUMER APPLICATIONS

One of the most frequent uses of percents in the real world is in problems called base-rate-percentage problems.

Model: 50% of 120 is 60 .
(rate) (base) (percentage)

Note several things about the statement:

1. The rate always has the % sign.
2. The word *of* points to the base.
3. The other figure, the one without the % or the *of*, is the percentage.

In every base-rate-percentage problem, we will be given two of the three figures and asked to find the third. You can look at all three, one at a time, and see what to do if you are asked to find it.

THE PERCENTAGE

Suppose the problem says, "How much is 47% of 130?" Note that you have the rate (47%; the % sign identifies it) and the base (130; the word *of* identifies the base). The missing item is the percentage. Follow this rule to find the percentage.

RULE 1

To find the percentage, multiply the base by the rate.

Note that you will need to change the rate from a percent to a decimal before you multiply.

Model: How much is 47% of 130?
 $130 \times 0.47 = 61.1$

Find the percentage in the following problems.

3.31 24% of 1,321 is how much? _____

3.32 What is 75% of 90? _____

3.33 How much is 19.5% of 600? _____

3.34 What is 48% of 576? _____

3.35 If you take 12% of 750, what do you get? _____

3.36 How much is 8% of 1,249? _____

THE RATE

Suppose the problem says, “What percent of 124 is 16?” Note that you do not have the rate. You have the base (124; —note the *of*) and the percentage (16). Follow this rule to find the rate.

RULE 2

To find the rate, divide the percentage by the base.

Your answer will be a decimal, so you will need to change it to a percent.

Model: What percent of 124 is 16?
 $16 \div 124 = 0.129 = 12.9\%$

Find the rate in the following problems (round to 3 decimal places before changing to percent).

3.37 What percent of 371 is 120? _____

3.38 150 is what percent of 200? _____

3.39 84 is what percent of 212? _____

3.40 What percent of 85 is 10? _____