PERCENT APPLICATIONS

Percents are useful in solving everyday math problems. Percent problems can be grouped into three types: finding percent, finding part, and finding base. A tool that can be very helpful in solving percent problems is the "percent box". First we'll look at the percent box and how it is used to solve "finding percent" problems

When given the percent and the whole, we can find the "part".   We'll look at the percent box and how it is used to solve "finding part" for percent problems.

When given the percent and the part, we can find the "whole".   Using the percent box we can solve "finding whole" for percent problems.

The Three Basic Types of Percent Problems

Percent means per hundred; thus, when we say 27% we mean 27 out of 100. Percents can be written as equivalent decimals and fractions.

$27\% = 0.27$ Move the decimal point two (2) places to the left.

$27\% = \dfrac{27}{100}$ Put 27 over 100 since percent means per hundred.

Percents greater than 100% represent whole numbers or mixed numbers.

$200\% = 2$ $\qquad$ $350\% = 3.5 = 3\dfrac{5}{10} = 3\dfrac{1}{2}$

The three basic types of percent problems are:

(1) finding the part (finding a percent of a number)
(2) finding percent
(3) finding the base

There are several ways to solve these three types of problems; however, we will focus on the "ratio-proportion" method.

When finding the part or the base, use the ratio $\dfrac{\textbf{is}}{\textbf{of}}$ to set up a proportion.

The **part** is near the word **"is"** and the **base** will follow the word **"of"**. The **percent** is identified by the word percent or the percent symbol (**%**).

Finding Part

To find **what part a percent is of the base**, use the following proportion.

$$\frac{\%}{100} = \frac{\text{is}}{\text{of}} \quad \rightarrow \quad \frac{\%}{100} = \frac{\text{part}}{\text{base}}$$

Example 1: What is 32% of 350?

What is 32% of 350?

$$\frac{\%}{100} = \frac{\text{is}}{\text{of}} \quad \rightarrow \quad \frac{32}{100} = \frac{n}{350}$$

The percent (32%) is placed over 100.
The base follows "of" and is 350.
The part is near "is" and is unknown (n).

Now solve:

$$\frac{32}{100} = \frac{n}{350}$$

$100n = 32(350)$	Cross Multiply
$100n = 11200$	Simplify
$n = 112$	Divide

Thirty-two percent of 350 is 112.

Other ways this problem may be stated are:

Thirty-two percent of 350 is what number?   Find 32% of 350.

Since this type of percent problem is used often, we will discuss another method which is quicker. To find part, the **percent of a number**, first write

the percent as a decimal by moving the decimal point two places to the left, and then multiply the given numbers together.

> To find 32% of 350 using the quicker method, simply change 32% to a decimal, interpret the "of" as multiplication, and then multiply.

$$32\% \text{ of } 350 =$$
$$= 0.32 \times 350$$
$$= 112.00$$
$$= 112$$

Finding Percent

To find **what percent a number is of another number**, let's go back to the percent proportion.

$$\frac{\%}{100} = \frac{\text{is}}{\text{of}} \rightarrow \frac{\%}{100} = \frac{\text{part}}{\text{base}}$$

> *Example 2*: Twenty-six is what percent of 50?

> Twenty-six is what percent of 50?

$$\frac{\%}{100} = \frac{\text{is}}{\text{of}} \rightarrow \frac{n}{100} = \frac{26}{50}$$

> The unknown percent (*n*) is placed over 100.
> The base follows "of" and is 50.
> The part is near "is" and is 26.

> Now solve:

$$\frac{n}{100} = \frac{26}{50}$$

$50n = 26(100)$	Cross Multiply
$50n = 2600$	Simplify
$n = 52$	Divide

$$\frac{52}{100} = 52\%$$

Fifty-two percent of 50 is 26.

Other ways this problem may be stated are:

What percent of 50 is 26?   Twenty-six out of 50 is what percent?

Finding Base

The third type of basic percent problems is **finding the base** when given the percent and part.

To find the base, we'll revisit the percent proportion one more time.

$$\frac{\%}{100} = \frac{is}{of} \quad \rightarrow \quad \frac{\%}{100} = \frac{part}{base}$$

Example 3: Seventy-five is 15% of what number?

Seventy-five is 15% of what number?

$$\frac{\%}{100} = \frac{is}{of} \quad \rightarrow \quad \frac{15}{100} = \frac{75}{n}$$

The percent (15%) is placed over 100.
The base follows "of" and is unknown (n).
The part is near "is" and is 75.

Now solve:

$$\frac{15}{100} = \frac{75}{n}$$

$15n = 75(100)$ Cross Multiply

$15n = 7500$ Simplify

$n = 500$ Divide

Seventy-five is 15% of 500.

Other ways this problem may be stated are:

Fifteen percent of what number is 75?

Click on the bricks below to play a game.

Mail It!   **Three types of Percent Problems**