

Use Proportions to Find Percent

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3.5 Use Proportions to Find Percent

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[Figure 1]

A senator wants to start a program to encourage more people to vote in his state. In County A, of the 39150 potential voters, 32,100 people voted. In neighboring County B, of the 81400 potential voters, 57,800 people voted. Which county needs the program more?

In this concept, you will use proportions to figure out percent.

Proportions

A **percent** is a part of a whole that represents a quantity out of 100. Fractions and decimals are also parts of a whole. Sometimes, you will be given information, but not a percent. You will need to know how to figure out the percent. Percentages, fractions, decimals and proportions can all help to you solve problems and figure out percent.

You began using proportions to figure out a percent when writing fractions as percent. Remember that proportions involve comparing quantities. A **proportion** is a comparison between two equal **ratios**. Because both of these are comparing, you can use proportions to help us figure out a percent.

First, write the proportion using a over b .

$$\frac{a}{b}$$

This is equal to the percent which is out of 100.

$$\frac{p}{100}$$

Here is the proportion:

$$\frac{a}{b} = \frac{p}{100}$$

Now let's apply this proportion to a problem.

What percent is 12 out of 45?

First, write a ratio comparing your given values to the missing percent.

$$\frac{12}{45} = \frac{p}{100}$$

Next, cross multiply.

$$\begin{aligned} \frac{12}{45} &= \frac{p}{100} \\ 45 \times p &= 12 \times 100 \\ 45 \times p &= 1200 \end{aligned}$$

Then, divide by 45 to isolate p .

$$\begin{aligned} 45 \times p &= 1200 \\ \frac{45p}{45} &= \frac{1200}{45} \\ p &= 26.7 \end{aligned}$$

The answer is 26.7.

Therefore 12 out of 45 is 26.7%.

Examples

Example 1

Earlier, you were given a problem about the voters.

County A has 39150 people and 32100 voted. County B has 81400 people and 57800 voted. Which county had the highest proportion of people voting?

First, write each ratio comparing your given values to the missing percent.

County A

$$\frac{32100}{39150} = \frac{p}{100}$$

County B

$$\frac{57800}{81400} = \frac{p}{100}$$

Next, cross multiply.

County A

$$\begin{aligned} \frac{32100}{39150} &= \frac{p}{100} \\ 39150 \times p &= 32100 \times 100 \\ 39150 \times p &= 3210000 \end{aligned}$$

County B

$$\begin{aligned} \frac{57800}{81400} &= \frac{p}{100} \\ 81400 \times p &= 57800 \times 100 \\ 81400 \times p &= 5780000 \end{aligned}$$

Then, divide to isolate p .

County A

$$\begin{aligned} 39150 \times p &= 3210000 \\ \frac{39150p}{39150} &= \frac{3210000}{39150} \\ p &= 81.99 \end{aligned}$$

County B

$$\begin{aligned}
 81400 \times p &= 5780000 \\
 \frac{81400p}{81400} &= \frac{5780000}{81400} \\
 p &= 71.0
 \end{aligned}$$

The answer is that 82% of the people in County A voted and 71% of the people in County B voted. Therefore, County A had the highest voter turnout and County B needs the senator's program more.

Example 2

John ran 8 out of 9 miles. What percent of the total miles did he **run**?

First, write a ratio comparing your given values to the missing percent.

$$\frac{8}{9} = \frac{p}{100}$$

Next, cross multiply.

$$\begin{aligned}
 \frac{8}{9} &= \frac{p}{100} \\
 9 \times p &= 8 \times 100 \\
 9 \times p &= 800
 \end{aligned}$$

Then, divide by 9 to isolate p .

$$\begin{aligned}
 9 \times p &= 800 \\
 \frac{9p}{9} &= \frac{800}{9} \\
 p &= 88.9
 \end{aligned}$$

The answer is 88.9.

Therefore, John ran 88.9% of the total miles.

Example 3

What percent is 18 out of 50?

First, write a ratio comparing your given values to the missing percent.

$$\frac{18}{50} = \frac{p}{100}$$

Next, cross multiply.

$$\begin{aligned}\frac{18}{50} &= \frac{p}{100} \\ 50 \times p &= 18 \times 100 \\ 50 \times p &= 1800\end{aligned}$$

Then, divide by 50 to isolate p .

$$\begin{aligned}50 \times p &= 1800 \\ \frac{50p}{50} &= \frac{1800}{50} \\ p &= 36\end{aligned}$$

The answer is 36. Therefore 18 out of 50 is 36%.

Example 4

What percent is 22 out of 40?

First, write a ratio comparing your given values to the missing percent.

$$\frac{22}{40} = \frac{p}{100}$$

Next, cross multiply.

$$\begin{aligned}\frac{22}{40} &= \frac{p}{100} \\ 40 \times p &= 22 \times 100 \\ 40 \times p &= 2200\end{aligned}$$

Then, divide by 40 to isolate p .

$$\begin{aligned}
 40 \times p &= 2200 \\
 \frac{40p}{40} &= \frac{2200}{40} \\
 p &= 55
 \end{aligned}$$

The answer is 55.

Therefore 22 out of 40 is 55%.

Example 5

What percent is 78 out of 80?

First, write a ratio comparing your given values to the missing percent.

$$\frac{78}{80} = \frac{p}{100}$$

Next, cross multiply.

$$\begin{aligned}
 \frac{78}{80} &= \frac{p}{100} \\
 80 \times p &= 78 \times 100 \\
 80 \times p &= 7800
 \end{aligned}$$

Then, divide by 80 to isolate p .

$$\begin{aligned}
 80 \times p &= 7800 \\
 \frac{80p}{80} &= \frac{7800}{80} \\
 p &= 97.5
 \end{aligned}$$

The answer is 97.5.

Therefore 78 out of 80 is 97.5%.

Review

Find p in the given problems using cross product. Round to the nearest tenths place.

1. $\frac{7}{15} = \frac{p}{100}$

2. $\frac{52}{3810} = \frac{p}{100}$

3. $\frac{16}{17} = \frac{p}{100}$

4. $\frac{3}{4} = \frac{p}{100}$

5. $\frac{3}{5} = \frac{p}{100}$

6. $\frac{1}{5} = \frac{p}{100}$

7. A dentist filled cavities in 8 of his 30 patients on Tuesday. What percent had cavities filled?

8. A florist delivered 18 out of 25 bouquets. What percent was delivered?

9. The baker sold 3 out of 4 dozen rolls. What percent was sold?

10. What percent is 85 out of 5000?

11. What percent is 15 out of 30?

12. What percent is 88 out of 1200?

13. What percent is 99 out of 200?

14. What percent is 100 out of 330?

15. What percent is 224 out of 5400?

Review (Answers)

To see the review answers, return to the [Table of Contents](#) and select 'Other Versions' or 'Resources'.

Resources

Example: Percent Problem
 86 is what percent of 1720?

$$\frac{86}{1720} = \frac{p}{100}$$

1720p


Proportion

$$\frac{\text{part}}{\text{whole}} = \frac{p}{100} \rightarrow \frac{86}{1720} = \frac{p}{100}$$

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