Finding a Percentage

by Sophia

☰ WHAT'S COVERED

This tutorial covers finding a percentage, through the definition and discussion of:

1. **Percent As Part of a Whole**
2. **Finding the Percentage of a Number**
3. **Methods for Finding the Percentage of a Number**

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1. Percent As Part of a Whole

A percentage is a number that relates a part to the whole. Percentages are viewed as portions of 100. In fact, the word percent literally means "per 100." Percentages can be expressed in percent form, decimal form, and fraction form.

⤷ EXAMPLE 45 percent can be written as 45%, 0.45, or 45/100.

$$45\% = 0.45 = \frac{45}{100}$$

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2. Finding the Percentage of a Number

What does it mean to find the percentage of a number?

⤷ EXAMPLE Suppose in a recent survey, 1,200 people were asked if they would vote for a certain candidate. The results showed that 50 percent said yes, that they would vote for the candidate. You can see in the pie chart below that 50% is the same as one-half.

Candidate Approval
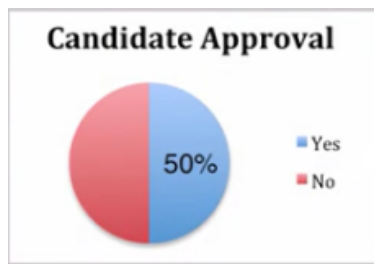
In fraction form, you know that 50% is one-half because 50% equals 50/100, which simplifies to 1/2. This also means that out of all the 1,200 people surveyed, 600 people said yes, they would vote for the candidate, because half of 1,200 is 600.
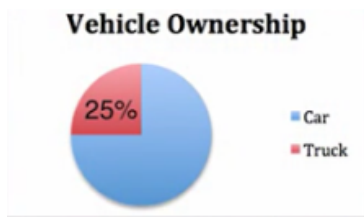
$$50\% = \frac{50}{100} = \frac{1}{2}$$

✎ **TRY IT**

Suppose in a recent survey 400 people were asked if they owned a car or a truck. The results showed that 25% owned a truck.

How can you determine how many people owned a truck?   +

In the pie graph below, you can see that 25 percent is the same as one-fourth.

Vehicle Ownership

In fraction form, you know that 25% is one-fourth because 25% can be written as 25/100, which simplifies to 1/4. Therefore, you can determine that out of all the 400 people surveyed, 100 people own a truck, because 1/4, or a quarter, of 400 is 100.

$$25\% = \frac{25}{100} = \frac{1}{4}$$

3. Methods for Finding the Percentage of a Number

There are three methods you can use to find the percentage of a number. Regardless of which method you use, you will arrive at the same answer.

Method 1: The first method is to multiply your percentage number by the number you are finding the percentage of, and then divide by 100.

> 🧪 **FORMULA TO KNOW**
>
> **Percentage of a Number**
>
> $$Find\ a\%\ of\ b = \frac{a \times b}{100}$$

⇨ **EXAMPLE** Suppose you want to find 60% of 2,000. Therefore, you have 60 times 2,000, which equals 120,000, then divided by 100 equals 1,200.

$$\frac{60 \times 2,000}{100} = \frac{120,000}{100} = 1,200$$

60% of 2,000 is equal to 1,200.

> **IN CONTEXT**
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> Suppose in a 2,000 calorie diet, 55% of your calories should come from carbohydrates. How many of your calories should be from carbohydrates? To answer this, you need to find 55% of 2,000.
>
> Using the first method, multiply 55 times 2,000, which equals 110,000. Then, divide by 100, which equals 1,100. Therefore, 1,100 calories of your diet should come from carbohydrates.
>
> $$\frac{55 \times 2,000}{100} = \frac{110,000}{100} = 1,100$$

Method 2: The second method is to write your percentage as a fraction and then multiply it by the number you are finding the percentage of.

> 🧪 **FORMULA TO KNOW**
>
> **Percentage of a Number**
>
> $$Find\ a\%\ of\ b = \left(\frac{a}{100}\right) \times b$$

⇨ **EXAMPLE** Again, if you are finding 60% of 2,000, you have 60/100 times 2,000 (or 2,000/1), which equals 120,000/100, which simplifies to 1,200.

$$\left(\frac{60}{100}\right) \times 2,000 = \frac{60}{100} \times \frac{2,000}{1} = \frac{120,000}{100} = 1,200$$

IN CONTEXT

Suppose a basketball player's free-throw percentage is 65%. In a certain game, she attempted to make 6 free throws. How many successful free throws would you expect her to have made? To answer this, you need to find 65% of 6 free throws.

Using the second method, write 65% as a fraction, which is 65/100, then multiply by 6, or 6/1. Multiplying across numerators equals 390, and multiplying across denominators equals 100. Dividing 390 by 100 equals 3.9, and rounding to the nearest whole number provides a final answer of 4 free throws made during the game.

$$\left(\frac{65}{100}\right) \times 6 = \frac{65}{100} \times \frac{6}{1} = \frac{390}{100} = 3.9 \approx 4$$

Method 3: The third method is to write your percentage as a decimal and then multiply it by the number you are finding the percentage of.

⚗ **FORMULA TO KNOW**

Percentage of a Number
$$\text{Find } a\% \text{ of } b = (a \div 100) \times b$$

⤳ **EXAMPLE** Using the original example of finding 60% of 2,000, you have 0.60 times 2,000, which equals 1,200.

$$(60 \div 100) \times 2,000 = 0.60 \times 2,000 = 1,200$$

IN CONTEXT

Suppose you go to a sale where all jewelry is 30% off. If a necklace costs $50, how much money will you save? You need to find 30% of $50.

Using the third method, write 30% as a decimal. You know that 30% is the same as 30 over 100, and dividing 30 by 100 equals 0.30. Next, multiply 0.30 by 50, which equals 15. Therefore, you will save $15 on the necklace.

$$(30 \div 100) \times 50 = 0.30 \times 50 = 15$$

⑦ **DID YOU KNOW**

In all three methods, you may have noticed that you used multiplication to find the percentage of a number. That's because the word "of" in math often means multiplication. For example, when finding 60% of 2,000,

you used multiplication and multiplied 60% by 2,000.

Percentage of a Number

$$\text{Find } a\% \text{ of } b = \frac{a \times b}{100}$$

$$\text{Find } a\% \text{ of } b = (\frac{a}{100}) \times b$$

$$\text{Find } a\% \text{ of } b = (a \div 100) \times b$$

✓ **SUMMARY**

Today you learned that a **percentage is a number that relates a part to the whole,** or in other words, that percentages are viewed as portions of 100. Percentages can be expressed in percent form, decimal form, and fraction form. You also learned that **finding the percentage of a number** means finding the portion of the number that is equivalent to the percentage out of 100. Lastly, you learned that **finding the percentage of a number can be done using one of three methods**, all of which involve multiplying the percentage by the number.

Source: This work is adapted from Sophia author Colleen Atakpu.

⚗ **FORMULAS TO KNOW**

Percentage of a Number

$$\text{Find } a\% \text{ of } b = \frac{a \times b}{100}$$

$$\text{Find } a\% \text{ of } b = \left(\frac{a}{100}\right) \times b$$

$$\text{Find } a\% \text{ of } b = (a \div 100) \times b$$