Conversion of Decimals, Fractions, and Percent

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CONCEPT 1

Conversion of Decimals, Fractions, and Percent

Here you'll learn how to convert percents to fractions, fractions to percents, decimals to percents, and percents to decimals.

What if you knew that 75% of your classmates owned a pet. How could you convert this number to a fraction or a decimal? After completing this Concept, you'll be able to switch back and forth between percents, fractions, and decimals.

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CK-12 Foundation: 0313S Percentages (H264)

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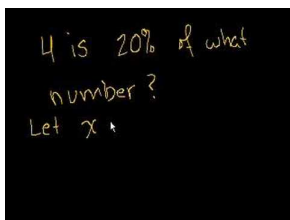
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KhanAcademy: TakingPercentages

Guidance

A **percent** is simply a ratio with a base unit of 100. When we write a ratio as a fraction, the percentage we want to represent is the numerator, and the denominator is 100. For example, 43% is another way of writing $\frac{43}{100}$. $\frac{43}{1000}$, on the other hand, is equal to $\frac{4.3}{100}$, so it would be equivalent to 4.3%. $\frac{2}{5}$ is equal to $\frac{40}{100}$, or 40%. To convert any fraction to a percent, just convert it to an equivalent fraction with a denominator of 100, and then take the numerator as your percent value.

To convert a percent to a decimal, just move the decimal point two spaces to the right:

$$67\% = 0.67$$
$$0.2\% = 0.002$$
$$150\% = 1.5$$

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And to convert a decimal to a percent, just move the decimal point two spaces to the left:

$$2.3 = 230\%$$
$$0.97 = 97\%$$
$$0.00002 = 0.002\%$$

Finding and Converting Percentages

Before we work with percentages, we need to know how to convert between percentages, decimals and fractions.

Converting percentages to fractions is the easiest. The word "percent" simply means "per 100"—so, for example, 55% means 55 per 100, or $\frac{55}{100}$. This fraction can then be simplified to $\frac{11}{20}$.

Example A

Convert 32.5% to a fraction.

Solution

32.5% is equal to 32.5 per 100, or $\frac{32.5}{100}$. To reduce this fraction, we first need to multiply it by $\frac{10}{10}$ to get rid of the decimal point. $\frac{325}{1000}$ then reduces to $\frac{13}{40}$.

Converting fractions to percentages can be a little harder. To convert a fraction directly to a percentage, you need to express it as an equivalent fraction with a denominator of 100.

Example B

Convert $\frac{7}{8}$ to a percent.

Solution

To get the denominator of this fraction equal to 100, we have to multiply it by 12.5. Multiplying the numerator by 12.5 also, we get $\frac{87.5}{100}$, which is equivalent to 87.5%.

But what about a fraction like $\frac{1}{6}$, where there's no convenient number to multiply the denominator by to get 100? In a case like this, it's easier to do the division problem suggested by the fraction in order to convert the fraction to a decimal, and *then* convert the decimal to a percent. 1 divided by 6 works out to 0.166666.... Moving the decimal two spaces to the right tells us that this is equivalent to about 16.7%.

Why can we convert from decimals to percents just by moving the decimal point? Because of what decimal places represent. 0.1 is another way of representing one tenth, and 0.01 is equal to one hundredth—and one hundredth is one percent. By the same logic, 0.02 is 2 percent, 0.35 is 35 percent, and so on.

Example C

Convert 2.64 to a percent.

Solution

To convert to a percent, simply move the decimal two places to the right. $2.64 = 264\%$.

Does a percentage greater than 100 even make sense? Sure it does—percentages greater than 100 come up in real life all the time. For example, a business that made 10 million dollars last year and 13 million dollars this year would have made 130% as much money this year as it did last year.

The only situation where a percentage greater than 100 doesn't make sense is when you're talking about dividing up something that you only have a fixed amount of—for example, if you took a survey and found that 56% of the respondents gave one answer and 72% gave another answer (for a total of 128%), you'd know something went wrong with your math somewhere, because there's no way you could have gotten answers from more than 100% of the people you surveyed.

Converting percentages to decimals is just as easy as converting decimals to percentages—simply move the decimal to the left instead of to the right.

Example D

Convert 58% to a decimal.

Solution

The decimal point here is invisible—it's right after the 8. So moving it to the left two places gives us 0.58.

It can be hard to remember which way to move the decimal point when converting from decimals to percents or vice versa. One way to check if you're moving it the right way is to check whether your answer is a bigger or smaller number than you started out with. If you're converting from percents to decimals, you should end up with a smaller number—just think of how a number like 50 percent, where 50 is **greater** than 1, represents a fraction like $\frac{1}{2}$ (or 0.50 in decimal form), where $\frac{1}{2}$ is **less** than 1. Conversely, if you're converting from decimals to percents, you should end up with a bigger number.

One way you might remember this is by remembering that a percent sign is bigger than a decimal point—so percents should be bigger numbers than decimals.

Watch this video for help with the Examples above.

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CK-12 Foundation: Percentages

Vocabulary

- A **percent** is simply a ratio with a base unit of 100—for example, $13\% = \frac{13}{100}$.
- The **percent equation** is Rate × Total = Part, or R% of Total is Part.
- The percent change equation is Percent change $= \dfrac{\text{final amount - original amount}}{\text{original amount}} \times 100\%$. A **positive** percent change means the value **increased**, while a **negative** percent change means the value **decreased**.

Guided Practice

a) *Convert 3.4 to a percent.*

b) *Convert $\frac{2}{7}$ to a percent.*

Solution

a) If you move the decimal point to the left, you get 0.034%. That's a smaller number than you started out with, but you're moving from decimals to percents, so you want the number to get bigger, not smaller. Move it to the right instead to get 340%.

b) $\frac{2}{7}$ doesn't convert easily unless you change it to a decimal first. 2 divided by 7 is approximately 0.285714..., and moving the decimal and rounding gives us 28.6%.

Practice

Express the following decimals as a percent.

1. 0.011
2. 0.001
3. 0.91
4. 1.75
5. 20

Express the following percentages in decimal form

6. 15%
7. 0.08%
8. 222%
9. 3.5%
10. 341.9%

Express the following fractions as a percent (round to two decimal places when necessary)

11. $\frac{1}{6}$
12. $\frac{5}{24}$
13. $\frac{6}{7}$
14. $\frac{11}{7}$
15. $\frac{13}{97}$

Express the following percentages as a reduced fraction.

16. 11%
17. 65%
18. 16%
19. 12.5%
20. 87.5%

Texas Instruments Resources

In the CK-12 Texas Instruments Algebra I FlexBook, there are graphing calculator activities designed to supplement the objectives for some of the lessons in this chapter. See http://www.ck12.org/flexr/chapter/9613.