

Working with Fractions, Decimals, and Percents

Why do we need to be able to do this?

Money involves decimals and percents all the time. Prices are expressed with decimal numbers. We use percents to figure sales tax, tips, discounted prices, and interest. Knowing how to estimate and compute with decimals and percents, whether with or without a calculator, is a critical skill for an adult in our society.

In math and science classes, you will need to move fluidly between fractions, decimals, and percents. For example, interest rates are usually quoted as percents, but you need to use their decimal form in order to calculate with them. Your teachers will expect you to be able to do this without relying on your calculator.

The translation between decimals and fractions will also let you check your answers to problems, with or without your calculator.

What should you be able to do?

Convert between fractions, decimals, and percents, with or without a calculator.

Decimal numbers and percents are just different ways to write fractions that have denominators some power of ten. “Percent” is another way to say “divided by 100.” So, for example, 62% is just another way to write 62/100. You can count to find the denominator of a decimal number – it’s 10 raised to the number of digits to the right of the decimal point. So, for example, 1.295 has a denominator of $10^3 = 1000$.

$$1.295 = \frac{1295}{1000}.$$

Converting between decimal numbers and percents is easy – just move the decimal two places. You can check if you’ve moved the decimal place the correct direction by remembering some of the common decimal and percent equivalents, like $.5 = 50\%$. So, for example, $.789 = 78.9\%$.

You can find a decimal approximation of a fraction by simply dividing the numerator by the denominator. To find the percent, just move the decimal place two places to the right. So, for example, $356/795$ is about 0.4478, or about 44.78% (I used a calculator for this one).

Recognize common fractions when they appear as decimals. If you use your calculator for a computation, you are likely to end up with a decimal approximation, an answer that fills your calculator screen with digits, but is a little bit wrong. That’s

because many fractions don't have neat, terminating decimal forms. It can be helpful to recognize some of the most common fractions in their decimal form, though:

Common Fraction	Decimal Form	Percent
$1/100$	.01 (exactly)	1%
$1/50$	.02 (exactly)	2%
$1/25$	.04 (exactly)	4%
$1/20$	.05 (exactly)	5%
$1/10$	.1 (exactly)	10%
$1/8$	.125 (exactly)	12.5%
$1/6$	.166667 (approximately)	16.7% (rounded)
$1/5$	.2 (exactly)	20%
$1/4$	.25 (exactly)	25%
$1/3$	.333333 (approximately)	33.3% (rounded)
$2/5$	.4 (exactly)	40%
$1/2$	.5 (exactly)	50%
$3/5$	.6 (exactly)	60%
$2/3$	.666667 (approximately)	66.7% (rounded)
$3/4$	.75 (exactly)	75%
$4/5$	.8 (exactly)	80%

Remember that whenever you use a calculator, you are only approximating the exact answer. If your calculator shows 4.3333, you can say only that the answer is about 4 and $1/3$.

Estimate the size of numbers using common decimals, fractions, and percents. You can use some of these common fractions, decimals, and percents to estimate (or check) an answer.

Example: In Washington, the sales tax charged on a restaurant meal is between 7% and 10%, depending on location. If you want to leave a 15% to 20% tip, you can estimate the amount quickly by “doubling the tax.”