

Percent Unit Notes

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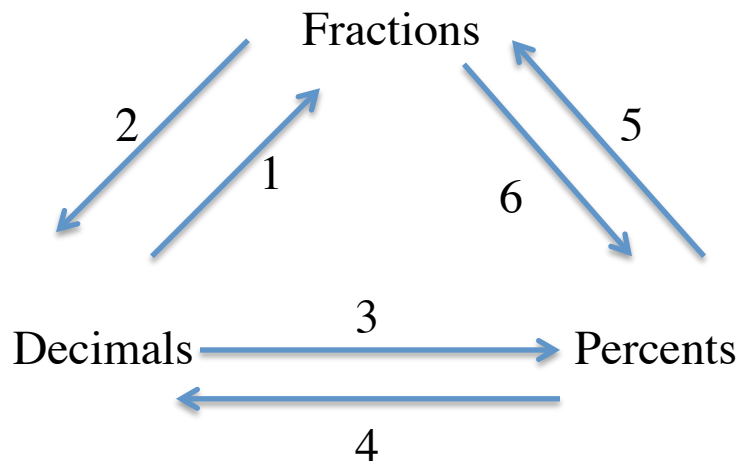
What is Percent?

Percent is a special ratio that compares a number to 100 using the symbol $\%$. Percent literally means “per hundred”. i.e. 40% of 100 is 40 and 40% of 200 is 80

What is Percentage?

Percentage is a number that is a given percent of another number. i.e. 25% of 60 is 15. The percentage is 15.

The Circle of Math: Converting between Fractions, Decimals, and Percents.



1. Converting Decimals to Fractions

The easiest way to convert a decimal to a fraction is to read the decimal according to place value.

Example 1: Read 0.25 as “twenty five hundredths” . This gives us the fraction $\frac{25}{100}$. Then just reduce the fraction to the lowest terms. $\frac{25}{100} = \frac{1}{4}$.

Example 2: Read 0.3 as “three tenths” . This gives us the fraction $\frac{3}{10}$. It is already reduced to lowest terms.

2. Converting Fractions to Decimals

To write a decimal for any fraction, divide the numerator by the denominator. This works because a fraction is a way of showing division.

$$\frac{3}{8} = 3 \div 8$$

$$\begin{array}{r} .375 \\ 8 \overline{) 3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

**Use a calculator: Numerator (top number) \div by Denominator (bottom number)

3. Converting Decimals to Percents

To convert a decimal to a percent, multiply the decimal by 100, then add on the % symbol. An easy way to multiply a decimal by 100 is to move the decimal point two places to the right.

4. Converting Percents to Decimals

Calculating the conversion from percents to decimals is done with division. Converting from a percent to a decimal is done by dividing the percentage value by 100. Note that the short way to convert from a percentage to a decimal is by removing the percentage sign and moving the decimal point 2 places to the left.

5. Converting Percents to Fractions

Write the percent as a fraction over 100. Reduce to the lowest possible terms (proper fraction or mixed number).

6. Converting Fractions to Percents

To write a fraction as a percent, we can convert it to an equivalent fraction with a denominator of 100. Another way to write a fraction as a percent is to divide its numerator by its denominator, then convert the resulting decimal to a percent.

Calculating Percents:

60 is what percent of 120.

Step 1: Write as a fraction $\frac{60}{120}$

Step 2: Turn the fraction into a decimal (numerator divided by denominator) then into a percent (multiply the decimal by 100).

Calculating a Percent of a Number:

Method 1

Find 15% of 60

Change 15% to a decimal and multiply by 60.

$$\begin{aligned} &= 15\% \text{ of } 60 \\ &\quad \downarrow \quad \downarrow \quad \downarrow \\ &= 0.15 \times 60 \\ &= 9 \end{aligned}$$

Method 2

Find 15% of 60

Use a proportion and cross multiply to solve

$$\begin{aligned} \frac{100\%}{60} &= \frac{15\%}{x} \\ 100x &= 15(60) \\ 100x &= 900 \\ x &= 9 \end{aligned}$$

Calculating a Whole Number from a Percent of a Number:

If 30% of a number is 27, what is the number? That means what is 100% of the number?

Step 1: Create a proportion (set of equivalent fractions)

$$\frac{100\%}{x} = \frac{30\%}{27}$$

Step 2: Solve for x by cross multiplying.

$$\begin{aligned} \frac{100\%}{x} &= \frac{30\%}{27} \\ 30x &= 27(100) \\ 30x &= 2700 \\ x &= 90 \end{aligned}$$

Calculating Discounts:

Step 1: Find the amount of the discount (percent of a number above).

Step 2: Subtract the discount to get the sale price.

Method 1

Find the sale price of a \$60 item on sale 15% off.

Change 15% to a decimal and multiply by 60.

$$= 15\% \text{ of } 60$$

$$= 0.15 \times 60$$

$$= \$9 \text{ amount of discount}$$

New price (subtract the discount):

$$\$60 - 9 = \$51.$$

Method 2

Find the sale price of a \$60 item on sale 15% off.

If the item is on sale 15% off, you will pay 85% of the price (100% - 15%).

Make a proportion and solve for x

$$\frac{100\%}{60} = \frac{85\%}{x}$$
$$85(60) = 100x$$
$$5100 = 100x$$
$$51 = x$$

The price will be \$51.

Calculating Tax:

Step 1: Find the amount of the tax (percent of a number above).

Step 2: Add the amount of tax to the price of the item to get the total cost.

Method 1

A \$40 item with 14% tax.

Change 14% to a decimal and multiply by 40 to get the amount of tax.

$$= 14\% \text{ of } 40$$

$$= 0.14 \times 40$$

$$= \$5.60 \text{ amount of tax}$$

New price (add the tax):
 $\$40 + 5.60 = \45.60 .

Method 2

A \$40 item with 14% tax.

If the item has 14% tax, then you will pay 114% of the price (100%+14%).

Make a proportion and solve for x

$$\frac{100\%}{40} = \frac{114\%}{x}$$

$$114(40) = 100x$$

$$4560 = 100x$$

$$45.60 = x$$

The cost with tax is \$45.60