

Chapter 8: Percents

Section 8.4 - Combined percent and percent of a percent

Percent of a percent

Example

29% of Earth is land and 38.4% of land is used for agriculture. What percent of **Earth** is used for agriculture?

$$\frac{29\%}{100\%} = 0.29$$

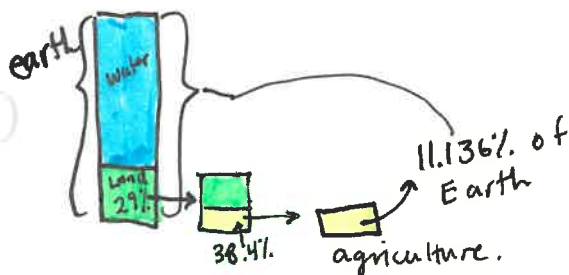
$$\frac{38.4\%}{100\%} = 0.384$$

$$0.29 \times 0.384 = 0.11136$$

$$0.11136 \times 100\% = 11.136\%$$

Key Points

- We need to find out what 38.4% of 29% is since we are only dealing with 29% total
- Convert percents to decimals
- Multiply those decimals together
- Similar to how we would find a percent of a number but now we are finding a percent of a percent



Try it out: I have provided the answers for you to check.

1) 12% of 32%

3.84%

2) 75% of 10% of 250mg

18.75mg

3) If 50% of your paycheck goes towards paying your rent and 15% of what is leftover goes towards buying groceries, what percent of your total paycheck is used on groceries? If your paycheck is \$1500, how much gets spent on groceries?

7.5%
\$112.50

Combined percents

Example - A school has 1200 students. It is estimated that this will **increase by 9%** next year but then there will be a **12% decrease** the following year. How many students will there be two years from now?

Method 1

Key Points

Find the increase and decrease separately

① 9% Increase

$$1200 \times 0.09 = 108$$

$$1200 + 108 = \underline{1308} \text{ students after 1 year}$$

- Determine what 9% of 1200 is and add that to the current number of students

② 12% decrease.

$$1308 \times 0.12 = 156.95$$

$$1308 - 156.95 = \underline{1151.04} \text{ students after 2 years}$$

- Determine what 12% of the number of students after the first year is and subtract that from the total

Method 2

Key Points

Combine percents first

① A.C

$$109\% \text{ of } 1200$$

$$1.09 \times 1200 = 1308$$

- ① • A 9% increase would mean that after one year you would have 109% compared to the first year.
 - $100\% + 9\% = 109\%$

② 88% of 1308

$$0.88 \times 1308 = \underline{1151.04}$$

- ② • A 12 % decrease would mean that would be left with 88% of what you had the previous year
 - $100\% - 12\% = 88\%$
- After you combine the percents use the same steps as Method 1

Method 3

Use combined percents and percent of a percent

Key Points

88% of 109% of 1200

$$0.88 \times 1.09 \times 1200$$

$$= \boxed{1151.04}$$

- Use the combined percents from method 2
 - 9% increase = 109%; 12% decrease = 88%
- Determine what 88% of 109% of 1200 is
- Note: we end up doing the exact same steps as Method 2 except we do it all in one step

Try it out:

If you purchase a home for **\$500,000** which has a **7%** decrease in value after one year but then a **12.5%** increase in value the following year, what would be the new value of your home after two years of owning it?

\$523,125

