

RATIOS AND RATES: SUMMARY OF KEY CONCEPTS*

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Abstract

This module is from Fundamentals of Mathematics by Denny Burzynski and Wade Ellis, Jr. This module reviews the key concepts from the chapter "Ratios and Rates."

1 Summary of Key Concepts

Denominate Numbers ([here](#)¹)

Numbers that appear along with units are **denominate numbers**. The amounts 6 dollars and 4 pints are examples of denominate numbers.

Like and Unlike Denominate Numbers ([here](#)²)

Like denominate numbers are denominate numbers with like units. If the units are not the same, the numbers are **unlike denominate numbers**.

Pure Numbers ([here](#)³)

Numbers appearing without a unit are **pure numbers**.

Comparing Numbers by Subtraction and Division ([here](#)⁴)

Comparison of two numbers by subtraction indicates how much more one number is than another. Comparison by division indicates how many times larger or smaller one number is than another.

Comparing Pure or Like Denominate Numbers by Subtraction ([here](#)⁵)

Numbers can be compared by subtraction if and only if they are pure numbers or like denominate numbers.

Ratio Rate ([here](#)⁶)

A comparison, by division, of two like denominate numbers is a **ratio**. A comparison, by division, of two unlike denominate numbers is a **rate**.

Proportion ([here](#)⁷)

A **proportion** is a statement that two ratios or rates are equal.

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¹"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

²"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

³"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

⁴"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

⁵"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

⁶"Ratios and Rates: Ratios and Rates" <<http://cnx.org/content/m34980/latest/>>

⁷"Ratios and Rates: Proportions" <<http://cnx.org/content/m34981/latest/>>

$\frac{3 \text{ people}}{2 \text{ jobs}} = \frac{6 \text{ people}}{4 \text{ jobs}}$ is a proportion.

Solving a Proportion (here⁸)

To **solve a proportion** that contains three known numbers and a letter that represents an unknown quantity, perform the cross multiplication, then divide the product of the two numbers by the number that multiplies the letter.

Proportions Involving Rates (here⁹)

When writing a proportion involving rates it is very important to write it so that the same type of units appears on the same side of either the equal sign or the fraction bar.

$$\frac{\text{unit type 1}}{\text{unit type 2}} = \frac{\text{unit type 1}}{\text{unit type 2}} \quad \text{or} \quad \frac{\text{unit type 1}}{\text{unit type 1}} = \frac{\text{unit type 2}}{\text{unit type 2}}$$

Five-Step Method for Solving Proportions (here¹⁰)

1. By careful reading, determine what the unknown quantity is and represent it with some letter. There will be only one unknown in a problem.
2. Identify the three specified numbers.
3. Determine which comparisons are to be made and set up the proportion.
4. Solve the proportion.
5. Interpret and write a conclusion.

When solving applied problems, ALWAYS begin by determining the unknown quantity and representing it with a letter.

Percents (here¹¹)

A ratio in which one number is compared to 100 is a **percent**. Percent means "for each hundred."

Conversion of Fractions, Decimals, and Percents (here¹²)

It is possible to convert decimals to percents, fractions to percents, percents to decimals, and percents to fractions.

Applications of Percents:

The three basic types of percent problems involve a **base**, a **percentage**, and a **percent**.

Base (here¹³)

The **base** is the number used for comparison.

Percentage (here¹⁴)

The **percentage** is the number being compared to the base.

Percent (here¹⁵)

By its definition, **percent** means *part of*.

Solving Problems (here¹⁶)

Percentage = (percent) \times (base)

$$\text{Percent} = \frac{\text{percentage}}{\text{base}}$$

$$\text{Base} = \frac{\text{percentage}}{\text{percent}}$$

⁸"Ratios and Rates: Proportions" <<http://cnx.org/content/m34981/latest/>>

⁹"Ratios and Rates: Proportions" <<http://cnx.org/content/m34981/latest/>>

¹⁰"Ratios and Rates: Applications of Proportions" <<http://cnx.org/content/m34982/latest/>>

¹¹"Ratios and Rates: Percent" <<http://cnx.org/content/m34983/latest/>>

¹²"Ratios and Rates: Percent" <<http://cnx.org/content/m34983/latest/>>

¹³"Ratios and Rates: Applications of Percents" <<http://cnx.org/content/m35007/latest/>>

¹⁴"Ratios and Rates: Applications of Percents" <<http://cnx.org/content/m35007/latest/>>

¹⁵"Ratios and Rates: Applications of Percents" <<http://cnx.org/content/m35007/latest/>>

¹⁶"Ratios and Rates: Applications of Percents" <<http://cnx.org/content/m35007/latest/>>