

## Unit 3: Ratios, Proportions, and Percentages

### Algebra Prep Honors

14 meetings

*Revised February 2026*

#### Essential Questions

- How can ratios and rates be used to relate and compare numbers?
- What kinds of relationships can proportions represent in real-world situations?

#### Enduring Understandings with Unit Goals

**EU 1:** Ratios compare two numbers and rates divide a ratio.

- Write and simplify ratios using the three different forms.
- Compare rates by calculating the unit rate.
- The units of rates can be converted when the conversion factor is known.
- Use conversion factors to convert unit rates to a given unit

**EU 2:** A proportion is an equation that states that two ratios are equal.

- Derive and solve proportions using real-world information.
- Create proportions to solve percentage problems in the real-world including percent change, discount, tip, and sales tax.

#### Standards

##### Common Core State Standards/College and Career Readiness Anchor Standards:

- **7.RP.A.1:** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.
- **7.RP.A.2:** Recognize and represent proportional relationships between quantities.
- **7.RP.A.3:** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
- **6.RP.A.3.D:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

#### ISAAC Vision of the Graduate Competencies

**Competency 1:** Write effectively for a variety of purposes.

**Competency 2:** Speak to diverse audiences in an accountable manner.

**Competency 3:** Develop the behaviors needed to interact and contribute with others on a team.

**Competency 4:** Analyze and solve problems independently and collaboratively.

**Competency 5:** Be responsible, creative, and empathetic members of the community.

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#### Unit Content Overview

##### 1. Ratios/Unit Rates

- Write and Simplifying Ratios
- Comparing Unit Rates
- Vocabulary: cross-multiplication, cross-product, equivalent, graph, greatest common factor (GCF), least common multiple (LCM), rate, ratio, table of values, unit rate, units

##### 2. Conversions

- Write and Simplify Expressions to Convert Units
- Vocabulary: conversion factor, conversion ratio, cross-canceling, equivalent, multi-step conversion, place value, rate, ratio, table of values, unit rate, units

##### 3. Proportions

- Solve Proportions
- Solve a Multi-Step Proportion
- Use Proportions to Solve Problems
- Vocabulary: coefficient, cross-multiplication, cross-product, equivalent, graph, place value, proportion, proportional relationship, ratio, table of values, variable

##### 4. Percentages

- Solve for a part, whole, or percent using proportions
- Use proportions to solve real-world percentage problems
- Vocabulary: coefficient, cross-multiplication, cross-product, equivalent, percent, percent problem, place value, proportion, proportional relationship, ratio, table of values, units, variable

##### 5. Change Expressed as a Percent

- Find a Percent Decrease
- Find a Percent Increase
- Vocabulary: coefficient, cross-multiplication, cross-product, discount, equivalent, gratuity, percent, percent of change, percent problem, place value, proportion, proportional relationship, ratio, sales tax, tip, units, variable

#### Interdisciplinary Connections

- Language Arts – Accountable Talk, Word Problems

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#### Daily Learning Objectives with *TWPS* Activities

##### Students will be able to...

- Compare and contrast numbers using ratios in fraction form.
  - *TWPS* – Name 2 differences between the given list of numbers. Explain using mathematical reasoning.
- Analyze and justify unit rates to determine which is a better buy
  - *TWPS* – Which of the three statements below is a lie? Equivalent Ratios with Food Two Truths, One Lie
- Convert unit rates into other given units by applying the properties of real numbers \*
  - *TWPS* – Write out the steps to solve a problem involving a unit rate. Explain using mathematical reasoning.
  - *TWPS* – Describe an example of when you would have to convert a unit rate in your everyday life. Explain using mathematical reasoning.
- Calculate unknown values in a proportion and apply them to real-world situations.
  - *TWPS* – Which one doesn't belong (Ratios Using a Colon)? Explain using mathematical reasoning.
- Solve problems involving percentages using proportions
  - *TWPS* – Find the error in setting up the proportion (Lemonade and Dollars). Explain using mathematical reasoning.
- Apply a proportion to find the percent of change in real-world situations.
  - *TWPS* – Which one doesn't belong (4 Numbers – 3, 27, 123, and 31)? Explain using mathematical reasoning.
- Find the discount price of an item, how much tip to leave, and the amount of sales tax added to a price.
  - *TWPS* – Describe an example of getting a discount and an example of giving someone a tip. Explain using mathematical reasoning.

#### Instructional Strategies/Differentiated Instruction

- *TWPS*
- Whole-group instruction
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Guided notes
- Student-led instruction
- Small group instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- CER
- Homework

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#### **EL DIFFERENTIATED INSTRUCTION:**

- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments

#### **Assessments**

##### **FORMATIVE ASSESSMENTS:**

- Accountable Talk Discussions
- Daily Think-Write-Pair Share (TWPS)
- Warm-ups (SBAC prep)
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Student-led instruction
- Homework
- Performance Task - Camping Trip

##### **SUMMATIVE ASSESSMENTS:**

- Pear Assessment Quiz – EU 1
- Unit 3 Test – EU 1 and 2
- FIAB: Ratios and Proportional Relationships
- Performance Task – Camping Trip

#### **Unit Task**

**Unit Task Name:** Camping Trip

**Description:** Students will use information learned in this unit about how ratios and rates are used to compare quantities (EU 1) and how to convert rates into different units (EU 2) to solve problems about a campsite and its distance away from other places. Students will use a map and ratios to compare the distances of a campsite from a parking lot. Students will convert a path from a map from inches to miles using proportions. They will then use the distances of two paths to find the error a student made in comparing two distances, their units, and how the student made the error. Using these distances and a given speed, students will also use ratios to find the fastest path. This information will also help students explain which path they would take and why.

**Evaluation:** Summative Performance Task Assessment Rubric

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#### Unit Resources

- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Pear Assessment
- Online resources
- State Common Core Standards Transition Tasks
- Quizizz
- Individual Whiteboards
- 2 Truths and 1 Lie