

TOPIC 2

Analyze and Use Proportional Relationships

In this topic, students extend their understanding of ratios to write equivalent ratios and proportions.

CONNECT THE MATH

Many mathematical relationships in daily living are proportional. Chicken wings can be ordered by the dozen—1 order : 12 wings, 2 orders : 24 wings, 3 orders : 36 wings, etc. Coffee can be bought by the pound—1 lb : \$7.50, 2 lb : \$15.00, 3 lb : \$22.50, etc. In these cases, there is a constant increase each time the purchased amount increases by 1. The graph of a proportional relationship is a line through $(0, 0)$.

Some relationships are not proportional, however. For example, the area of a raised garden bed in the shape of a square grows predictably with the length of one side ($1 \text{ ft} : 1 \text{ ft}^2$, $2 \text{ ft} : 4 \text{ ft}^2$, $3 \text{ ft} : 9 \text{ ft}^2$), but for each foot of length, there is not a constant increase in area.

When discussing mathematical relationships with your student, ask how to determine whether or not the relationship is proportional.





LESSON 2-1

Connect Ratios, Rates, and Unit Rates

Equivalent ratios and unit rates can be used to compare ratios and solve problems.

LESSON OBJECTIVES

- Use ratios and rates to describe the relationship between two quantities.
 - Find equivalent ratios and use unit rates to solve multi-step problems.
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HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Solve a Word Problem Using Unit Rates?](#)

You can use these search terms and phrases to help your student find additional help online:

- finding unit rates
- using unit rates to solve problems

- comparing unit rates

LESSON 2-2

Determine Unit Rates with Ratios of Fractions

A unit rate can be easier to use to solve problems than a ratio of fractions.

LESSON OBJECTIVES

- Find unit rates with ratios of fractions.
- Use unit rates to solve multi-step problems.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Use Unit Rates to Compare Rates?](#)

You can use these search terms and phrases to help your student find additional help online:

- finding a unit rate involving unit fractions
- finding a unit rate involving decimals
- find a unit rate
- using unit rates to solve problems

LESSON 2-3

Understand Proportional Relationships: Equivalent Ratios

Quantities in a proportional relationship can be described by equivalent ratios.

LESSON OBJECTIVES

- Determine whether quantities are proportional by testing for equivalent ratios.
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HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Determine Whether Values in a Table Are Proportional?](#)
- [How Do You Know If Two Ratios Are Proportional?](#)

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:

- [proportion](#)
- [proportional relationship](#)

You can use these search terms and phrases to help your student find additional help online:

- recognizing a proportional relationship
 - recognizing a relationship that is not proportional
 - testing for equivalent ratios
 - using a proportion to solve a problem
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LESSON 2-4

Describe Proportional Relationships: Constant of Proportionality

Equations in the form $y = kx$, where k is the constant of proportionality, can be used

to represent proportional relationships and solve problems.

LESSON OBJECTIVES

- Use the constant of proportionality to write equations that represent proportional relationships.
 - Use equations to solve problems involving proportional relationships.
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HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Find the Constant of Variation from a Direct Variation Equation?](#)
- [What's the Direct Variation or Direct Proportionality Formula?](#)

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:

- [constant of proportionality](#)

You can use these search terms and phrases to help your student find additional help online:

- writing an equation for a proportional relationship
 - solving problems involving proportional relationships
 - using the equation $y = kx$
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LESSON 2-5

Graph Proportional Relationships

The graph of a proportional relationship is a straight line through the origin.

LESSON OBJECTIVES

- Use a graph to recognize proportionality.
 - Identify a constant of proportionality from a graph.
 - Interpret the graph of a proportional relationship from a written description, a table, and an equation.
 - Interpret a point on a graph of a proportional relationship.
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HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [What Does Direct Variation Look Like on a Graph?](#)

You can use these search terms and phrases to help your student find additional help online:

- graphing a proportional relationship
 - interpreting a proportional relationship
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LESSON 2-6

Apply Proportional Reasoning to Solve Problems

By recognizing proportional quantities, you can use what you know about proportional relationships to solve problems.

LESSON OBJECTIVES

- Explain whether a situation represents a proportional or a nonproportional relationship.
 - Use representations to find entry points into problems.
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HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Solve a Word Problem Using the Direct Variation Formula?](#)

You can use these search terms and phrases to help your student find additional help online:

- using proportional reasoning to make a table
- recognizing proportional relationships
- representing proportional relationships with a bar diagram
- writing an equation for a proportional relationship