# TOPIC 4

### **Represent and Solve Equations and Inequalities**

In this topic, students learn that a problem situation can often be represented by an equation or an inequality that includes a variable. The equation or inequality can then be solved to find a solution to the problem situation.

# **CONNECT THE MATH**

A problem with one solution can be modeled by an equation. A problem with more than one solution can be modeled by an inequality.

A gallon of paint covers an area of  $400 \text{ ft}^2$ . For  $1,250 \text{ ft}^2$  of wall, solving the inequality  $400p \ge 1,250$  gives the number of gallons of paint needed to complete the project. A pack of three roller covers cost \$9.99. Solving the equation 3c = 9.99 will tell how much each roller cover costs.

Point out to your student that, while many real-world situations call for an exact answer, inequalities are important for answering questions such as "Is there enough?" or "Will there be any left over?"





# LESSON 4-1

### **Understand Equations and Solutions**

A solution of an equation is a value for the variable that makes the equation true. An equation is true when the expressions or numbers on both sides of the equal sign have the same value.

#### **LESSON OBJECTIVES**

- Identify equations and variables.
- Use substitution to find solutions to equations.

#### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

How Do You Solve an Equation by Guessing and Checking?

#### **Review Key Vocabulary**

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

- <u>equation</u>
- solution of an equation

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

- writing an equation
- substituting a value into an equation

# **LESSON 4-2** Apply Properties of Equality

The same number can be added to, subtracted from, or multiplied on both sides of an equation and equality is maintained. Dividing both sides of an equation by the same nonzero number also maintains equality.

#### **LESSON OBJECTIVES**

- Use the properties of equality to keep both sides of an equation equal.
- Identify which properties of equality are used to write equivalent expressions.

#### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

- What's the Addition Property of Equality?
- What's the Multiplication Property of Equality?

#### **Review Key Vocabulary**

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

- <u>Addition Property of Equality</u>
- Division Property of Equality
- <u>Multiplication Property of Equality</u>
- Subtraction Property of Equality

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

• using properties of equality

# **LESSON 4-3**

### Write and Solve Addition and Subtraction Equations

A problem situation can be represented by an equation with a variable. The equation can be solved by using the inverse operation and a property of equality.

### **LESSON OBJECTIVES**

- Write one-variable addition and subtraction equations.
- Use inverse relationships and properties of equality to solve one-step addition and subtraction equations.

### 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 with an Equation Using Subtraction?
- How Do You Solve a Word Problem with an Equation Using Addition?

#### **Review Key Vocabulary**

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

• <u>inverse relationship</u>

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

- writing an equation with addition or subtraction
- solving an equation with addition or subtraction
- solving a problem with an equation

# **LESSON 4-4**

### Write and Solve Multiplication and Division Equations

A multiplication or division problem situation can be represented by an equation with a variable. The equation can be solved by using the inverse operation.

### **LESSON OBJECTIVES**

- Write one-variable multiplication and division equations.
- Use inverse relationships and properties of equality to solve one-step multiplication and division equations.

#### 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 with an Equation Using Division?
- How Do You Solve a Word Problem with an Equation Using Multiplication?

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

- writing an equation with multiplication or division
- solving an equation with multiplication or division

## **LESSON 4-5** Write and Solve Equations with Rational Numbers

Inverse relationships and properties of equality can be used to solve equations with fractions, mixed numbers, and decimals.

#### **LESSON OBJECTIVES**

• Write and solve equations that involve fractions, decimals, and mixed numbers.

### 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 with an Equation Using Subtraction?
- How Do You Solve an Equation Where You're Multiplying Fractions?

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

- writing an equation with fractions
- solving an equation with fractions
- writing an equation with decimals
- solving an equation with decimals

# **LESSON 4-6**

### **Understand and Write Inequalities**

An inequality is a mathematical sentence that contains the inequality symbol < (is less than), > (is greater than),  $\leq$  (is less than or equal to),  $\geq$  (is greater than or equal to), or  $\neq$  (is not equal to). An inequality describes a situation that has an infinite number of numerical possibilities.

#### **LESSON OBJECTIVES**

- Understand the symbols needed to write an inequality.
- Write inequalities to describe mathematical or real-world situations.

### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

- What's an Inequality?
- How Do You Write an Inequality from a Number Line Graph?

#### **Review Key Vocabulary**

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

• <u>inequality</u>

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

• writing an inequality

LESSON 4-7

### **Solve Inequalities**

An inequality is a mathematical sentence that contains the inequality symbol < (is less than), > (is greater than),  $\leq$  (is less than or equal to),  $\geq$  (is greater than or equal to), or  $\neq$  (is not equal to). An inequality describes a situation that has an infinite number of numerical possibilities.

#### **LESSON OBJECTIVES**

- Describe solutions to an inequality.
- Represent solutions to an inequality on a number line.

#### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

- How Do You Graph an Inequality or an Infinite Set on a Number Line?
- How Do You Determine if a Value is a Solution to an Inequality?

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

- solve a one-step inequality
- graph an inequality on a number line

# **LESSON 4-8**

### **Understand Dependent and Independent Variables**

Variables can be used to represent quantities that change in relationship to one another. The dependent variable changes in response to the independent variable.

#### **LESSON OBJECTIVES**

- Identify dependent variables.
- Identify independent variables.

#### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

• What Are Dependent and Independent Variables?

#### **Review Key Vocabulary**

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

- <u>dependent variable</u>
- independent variable

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

• how are dependent and independent variables related

# **LESSON 4-9** Use Patterns to Write and Solve Equations

Patterns can be used to identify the relationship between quantities and write an

equation that describes the relationship.

#### **LESSON OBJECTIVES**

- Analyze the relationships between the variables using tables.
- Write equations to represent the relationships between variables.

#### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

• How Do You Write a Linear Equation From a Table?

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

- write a linear equation from a table of values
- linear patterns in tables

# **LESSON 4-10**

### **Relate Tables, Graphs, and Equations**

Tables, graphs, and equations can be used to analyze the relationship between dependent and independent variables.

#### **LESSON OBJECTIVES**

• Analyze the relationships between dependent and independent variables using tables, graphs, and equations.

### HOW CAN YOU HELP WITH HOMEWORK

#### **Review Lesson Content**

Watch and share these video tutorials with your student:

• How Do You Graph a Linear Equation From a Table?

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

- graph a linear equation from a table of values
- relate a linear equation to a graph