

# Eureka Math Parent Guide

A GUIDE TO SUPPORT PARENTS AS THEY WORK WITH THEIR STUDENTS IN MATH.

GRADE 7  
MODULE 3

## GRADE FOCUS

Seventh grade mathematics is about (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

- Module 1: Ratios and Proportional Relationships
- Module 2: Rational Numbers
- » **Module 3: Expressions and Equations**
- Module 4: Percent and Proportional Relationships
- Module 5: Statistics and Probability
- Module 6: Geometry

LET'S CHECK IT OUT!

## MODULE 3 FOCUS

In this 26-lesson module, students examine how the properties of addition, subtraction, multiplication, and division are applied algebraically to write expressions in equivalent forms and find solutions to equations. They also use linear equations to solve unknown angle problems. Students use the number line to understand the properties of inequality. As students work to determine the area of circles in this module, they understand the meaning of pi and what the symbol,  $\pi$ , represents in terms of the value of the ratio. Students will work with expressions and equations to solve problems involving composite area in the plane, as well as volume and surface area of right prisms.

MORE SPECIFICALLY, CHILDREN WILL LEARN HOW TO:

- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example,  $a + 0.05a = 1.05a$  means that "increase by 5%" is the same as "multiply by 1.05."*
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations. *For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional  $1/10$  of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar  $9\frac{3}{4}$  inches long in the center of a door that is  $27\frac{1}{2}$  inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*

- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Know the formulas for the area and circumference of a circle and use them to solve problems.
- Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## TOPIC OVERVIEW

Topics are the lessons within a module that help children master the skills above. Here are the lessons that will guide your child through Module 3:

- Topic A: Use Properties of Operations to Generate Equivalent Expressions
- Topic B: Solve Problems Using Expressions, Equations, and Inequalities
- Topic C: Use Equations and Inequalities to Solve Geometry Problems

## WORDS TO KNOW

- **An Expression in Expanded Form:** For example,  $8x + 10$ ,  $2x + 3x$ , and  $400 + 40 + 7$  are all written in expanded form.
- **An Expression in Standard Form:** For example,  $4y + y + 2x$  is in expanded form and  $5y + 2x$  is in standard form because like terms have been combined.  $400 + 40 + 7$  is in expanded form and 447 is in standard form.
- **An Expression in Factored Form:** For example, 2 is a common factor in the expression  $8x + 10$  (expanded form). The distributive property can be used to write this as a product of 2 and  $(4x + 5)$  or  $2(4x + 5)$ .
- **Coefficient of the Term:** The number being multiplied by a variable. Convention states that the coefficient should be written immediately before the variable. For example, in the expression  $8x$ , 8 is the coefficient.
- **Circle:** Given a point  $C$  in the plane and a number  $r > 0$ , the circle with center  $C$  and radius  $r$  is the set of all points in the plane that are distance  $r$  from the point  $C$ .
- **Diameter of a Circle:** The diameter of a circle is the length of any segment that passes through the center of a circle whose endpoints lie on the circle. If  $r$  is the radius of a circle, then the diameter is  $2r$ .
- **Circumference:** The length around a circle.
- **Pi:** The number  $\pi$ , denoted  $\pi$ , is the value of the ratio given by the circumference to the diameter, that is,  $\pi = (\text{circumference})/(\text{diameter})$ .

# SAMPLE PROBLEMS

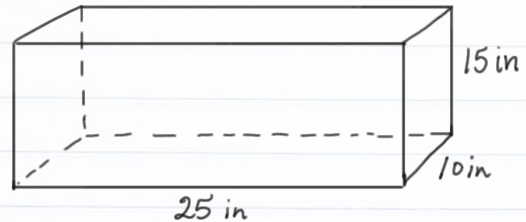
## SAMPLE 1

Write an expression equivalent to  $2x + 3 + 5x + 6$  by combining like terms.

**Solution:**  $2x + 3 + 5x + 6 = 7x + 9$

## SAMPLE 2

### Volume and Surface Area of Right Prisms



Volume of right rectangular prism:  $3750 \text{ in}^3$

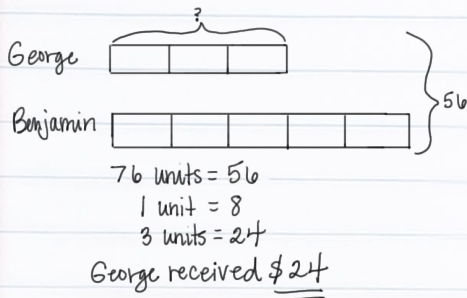
The surface area of the right rectangular prism:  $1550 \text{ in}^2$

## SAMPLE 3

Our model in the spotlight is a tape diagram, also known as a strip diagram, bar model, fraction strip, or length model. Tape diagrams are drawings that look like a segment of tape and are used to illustrate number relationships. They help students see relationships, enabling them to make sense of complex problems, strengthening their critical thinking skills, and promoting the development of problem solving abilities that will be critical in their middle school and high school years.

**Problem:** A sum of money was shared between George and Brian in a ratio of 3:4. If the sum of money was \$56, how much did George get?

**Solution** (shown below):



### Explanation:

We know that, by the given ratio, George had three equal size parts of the money and Benjamin had 4 equal size parts of the money. This is represented by equal size units labeled with each of the boys' names. The total amount of money is \$56, and there are a total of 7 equal units. Thus, the total amount of money must be shared equally among the 7 units. \$56 divided by 7 units tells us that 1 unit is equal to \$8 so 3 units is equal to \$24.

## SAMPLE 4

In this module, students discover the most famous ratio of all,  $\pi$ , and begin to appreciate why it has been chosen as the symbol to represent the Grades 6–8 mathematics curriculum, A Story of Ratios. Below is an example of how to determine the area and circumference of a circle using  $\pi$ , as well as the commonly used approximation, 3.14.

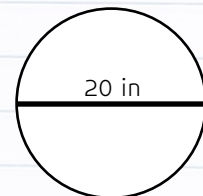
A circle has a diameter of 20 inches. Find the exact area and find an approximate area using  $\pi \approx 3.14$ .

If the diameter is 20 in., then the radius is 10 in. If  $A = \pi r^2$ , then  $A = \pi \cdot (10 \text{ in.})^2$  or  $100\pi \text{ in}^2$ .

$A \approx (100 \cdot 3.14) \text{ in}^2 \approx 314 \text{ in}^2$

What is the circumference of the circle using  $\pi \approx 3.14$ ?

If the diameter is 20 in., then the circumference is  $C = \pi d$  or  $C \approx 3.14 \cdot 20 \text{ in.} \approx 62.8 \text{ in.}$



# HOW YOU CAN HELP AT HOME

- Every day, ask your child what they learned in school and ask them to show you an example.
- Ask your child to explain the units used when determining volume and surface area. Why does this make sense?
- In the example above, Volume and Surface Area of Right Prisms, ask your child to prove the two solutions shown.
- Discuss with your child the meaning of  $\pi$ . Why is this ratio so important?