Eureka Math Parent Guide

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

GRADE 6
MODULE 4

GRADE FOCUS

Sixth grade mathematics is about (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) dividing more complex fractions and extending idea of rational numbers to include negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

- Module 1: Ratios and Unit Rates
- Module 2: Arithmetic Operations Including Dividing by a Fraction
- Module 3: Rational Numbers
- » **Module 4: Expressions and Equations**
- Module 5: Area, Surface Area, and Volume Problems
  Module 6: Statistics

LET'S CHECK IT OUT!

MODULE 4 FOCUS

Students begin to use variables (letters) to represent numbers and see that arithmetic is carried out exactly as it is with numbers.

MORE SPECIFICALLY, CHILDREN WILL LEARN HOW TO:

- Write, read, and evaluate expressions in which variables (letters) stand for unknown numbers. *For example, express "subtract y from 5" as 5–y.*
- Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient).
- Use Order of Operations to evaluate expressions involving whole-number exponents. *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s=1/2.*
- Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2+x) to produce the equivalent expression 6+3x; apply the distributive property to the expression 24x+18y to produce the equivalent expression 6(4x+3y).*
- Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y+y+y and 3y are equivalent because they name the same number regardless of which number y stands for.*
- Solve one-variable equations and inequalities including using substitution to determine whether a given number makes an equation or inequality true.

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 4:

- Topic A: Relationships of the Operations
- Topic B: Special Notations of Operations
- Topic C: Replacing Letters and Numbers
- Topic D: Expanding, Factoring, and Distributing Expressions
- Topic E: Expressing Operations in Algebraic Form
- Topic F: Writing and Evaluating Expressions and Formulas
- Topic G: Solving Equations
- Topic H: Applications of Equations

WORDS TO KNOW

- **Simple Expression**: A *simple expression* is a number, a variable (letter), a product whose factors are either numbers or variables involving whole number exponents, or sums and/or differences of such products. Each product in a simple expression is called a *term*, and the evaluation of the numbers in the product is called the *coefficient of the term*. The following are all examples of simple expressions: 2, x, $5y^2$, 10 – x.
- **Linear Expression**: A *linear expression* is a product of two simple expressions where only one of the simple expressions has letters and only one letter in each term of that expression or sums and/or differences of such products (e.g. 3x, (4x)(2), x + 4, m/50).
- **Equivalent Expressions:** Two simple expressions are *equivalent* if both equal same number for every substitution of numbers into all the letters in both expressions (e.g. y + y + y and 3y).
- **Equation:** An *equation* is a statement of equality between two expressions (e.g. 7a = 14)
- **Truth Values of a Number Sentence**: A number sentence is said to be *true* if both numerical expressions are equivalent; it is said to be *false* otherwise. *True* and *false* are called truth values.
- **Exponential Notation for Whole Number Exponents**: Let *m* be a non-zero whole number. For any number *a*, we define a to be the product of m factors of a, i.e., $a^m = a \cdot a \cdot a \cdot a \ldots \cdot a$ (multiplied together m times). The number a is called the *base*, and m is called the exponent, or power of a.

SAMPLE PROBLEMS

SAMPLE 1

In the example below, students develop expressions involving addition and subtraction from real-world problems. They also evaluate these expressions for given values.

Noah and Carter are collecting box tops for their school. They each bring 1 box top per day starting on the first day of school. However, Carter had a head start because his aunt sent him 15 box tops before school began. Noah's grandmother saved 10 box tops, and Noah added those on his first day.

1. Fill in the missing values that indicate the total number of box tops each boy brought to school.

School Day	Noah	Carter
1	11	16
2		
3		
4		
5		

School Day	Noah	Carter
1	11	16
2	12	17
3	13	18
4	14	19
5	15	20

Solution ←

2. If we let D be the total number of days since school started, on day D of school, how many box tops will Noah have brought to school? *Solution: D + 10*
3. On day D of school, how many box tops will Carter have brought to school? *Solution: D + 15*
4. On day 10 of school, how many box tops will Noah have brought to school? *20 box tops*
5. On day 10 of school, how many box tops will Carter have brought to school? *25 box tops*

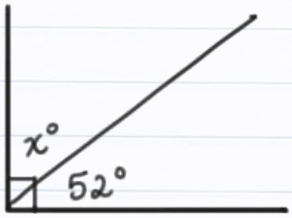
SAMPLE 2

Here are two examples of problems that require students to write an expression in which variables (letters) stand in for numbers:

1. *b* decreased by *c* squared → $b - c^2$
2. 24 divided by the product of 2 and *a* → $24/2a$

Writing & Solving Equations

Solve for *x*.



Solution:

$x° + 52° = 90°$
$x° + 52° - 52° = 90° - 52°$
$x° = 38°$

HOW YOU CAN HELP AT HOME

- Ask your child what they learned in school today, and ask them to show you an example.
  - » Using the following set of numbers, ask your child to determine the number(s) that make the inequality true: {0,1,5,8,11,17}, 5 h › 40
  - » *Solution: h can be 11 or 17*
- Ask your child to explain the difference between a straight angle and a reflex angle.
  - » *Solution: A straight angle has a measurement of exactly 180° while a reflex angle has a measurement between 180° and 360°.*
- Have your child graph the following expression on a number line: Tarek has more than $5
  - » *Solution: T › 5*