

What We Are Learning

Patterns and Relationships

Vocabulary

These are the math words we are learning:

algebraic expression an expression that consists of constants, variables, and operations

Associative Property

property that states that when you add or multiply, you can group numbers in any combination

base when a number is written in exponential form, the number that is used as a factor is the base

Commutative Property

property that states that when you add or multiply, you can do so in any order

Distributive Property

property that states that a number times a sum equals the sum of the products of that number and each addend

exponent a number that tells how many times to multiply the base by itself

Identity Property

property that states that the product of 1 and a number and the sum of 0 and a number is that number

numerical expression

an expression made up of numbers and operations

Dear Friend 4

The student is learning to represent numbers by using exponents. Just as multiplication is valuable when you are representing repeated addition, exponents are valuable when you are representing repeated multiplication. An exponent is a part of a power. It is a number that represents how many times the base is to be multiplied by itself. A power with base 3 and exponent 4 is written 3^4 . The example below shows how the student will find the value of a number with an exponent.

Find the value of 3^4 .

$$3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81 \quad \text{Multiply the base 3 by itself 4 times.}$$

Finding the value of a power is also known as evaluating the power. The student will evaluate powers when following the order of operations, a set of rules that standardize how to simplify expressions.

Order of Operations
1. Perform operations within grouping symbols.
2. Evaluate powers.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

Here is how the student will simplify an expression using the order of operations.

Simplify $3^2 \cdot 6 + 4$.

$$3^2 \cdot 6 + 4 \quad \text{There are no parentheses.}$$

$$9 \cdot 6 + 4 \quad \text{Evaluate the power.}$$

$$54 + 4 \quad \text{Multiply.}$$

$$58 \quad \text{Add.}$$

These rules will help the student simplify many types of mathematical expressions. When working with multi-operational problems, have the student explain which step to do first, second, third, and so on.

You can emphasize the importance of following the order of operations by having the student compare the results of a numerical expression simplified correctly with one simplified incorrectly. For example, if you follow the order of operations to simplify $66 - (6 \cdot 5) \div (3 \cdot 5)$, the result is 64. If you disregard the rules and perform the operations from left to right, the result is 500.

order of operations
the rules that must be followed when simplifying expressions

power a number written as a base and an exponent

The following properties will help the student simplify expressions. These properties apply to all numbers.

Property	Words	Algebra
Commutative Property	Add or multiply. You can group the numbers in any order.	$a + b = b + a$ $k \cdot m = m \cdot k$
Associative Property	When you add or multiply, you can group the numbers together in any combination.	$(p + s) + t = p + (s + t)$
Distributive Property	A multiplier outside the parentheses of another operation can be applied to each number inside the parentheses before the operation is performed.	$d(e + f) = d(e) + d(f)$

The student will learn to evaluate an algebraic expression by substituting a given value for a variable and using the order of operations. Follow the method below no matter how many variables are given in the expression.

Evaluate $5b + 7$ for $b = 6$.

$$5b + 7$$

$$5(6) + 7$$

$$30 + 7$$

$$37$$

Substitute 6 for b .

Multiply before adding.

Add.

Being able to recognize math terminology is an important skill. Listed below are some key phrases that may help the student write algebraic expressions.

Operations	Key Word Phrases	Expression
Addition +	a number plus 7 the sum of a number and 7 7 more than a number	$m + 7$
Subtraction -	a number minus 10 10 less than a number a number decreased by 10	$m - 10$
Multiplication ×	9 times a number the product of 9 and a number	$9m$
Division ÷	a number divided by 4 4 divided into a number the quotient of a number and 4	$m \div 4$ or $\frac{m}{4}$

Sincerely,

What We Are Learning

Solving Equations

Vocabulary

These are the math words we are learning:

equation a mathematical statement that says two quantities are equal

inverse operations operations that undo each other

solution a value that makes the equation true

Dear Family,

In the previous section, the student learned to translate words into numbers, variables, and operations. The student will build on this skill by learning to solve equations. The first step in solving equations is understanding that the solution for the equation makes the equation true. The student will learn how to determine whether a specific value is a solution of an equation.

This is how the student will determine whether a given value is a solution to an equation.

Determine whether the given value of the variable is a solution.**A. $b - 9 = 22$ for $b = 27$**

$$27 - 9 \stackrel{?}{=} 22$$

Substitute 27 for b .

$$18 \stackrel{?}{=} 22$$

Subtract.

$$18 \neq 22$$

Since 18 does not equal 22, 27 is not a solution to $b - 9 = 22$.

B. $17v = 102$ for $v = 6$

$$17 \cdot 6 \stackrel{?}{=} 102$$

Substitute 6 for v .

$$102 \stackrel{?}{=} 102$$

Multiply.

Since $102 = 102$, then 6 is a solution to $17v = 102$.

The student will use this skill to check the solutions to the equations he or she will be solving.

Once the student knows how to check whether a solution to an equation is true, he or she will learn how to solve four different types of whole number equations. These equations involve addition, subtraction, multiplication, and division. For each equation type, the student will learn how to “undo” the given operation by performing the inverse or opposite operation.

One of the most important and often overlooked steps in equation solving is checking to make sure the solution is correct. Reinforce with the student the importance of checking his or her solution.

Solve each equation. Check your answers.

$$x + 77 = 115$$

$$\begin{array}{r} -77 \\ x = 38 \end{array}$$

77 is added to x .

Subtract 77 from both sides to undo the addition.

Check $x + 77 \stackrel{?}{=} 115$

$$\begin{array}{r} 38 + 77 \stackrel{?}{=} 115 \\ 115 = 115 \checkmark \end{array}$$

Substitute 38 for x in the equation. 38 is the solution.

$$k - 14 = 35$$

$$\begin{array}{r} +14 \\ k = 49 \end{array}$$

14 is subtracted from k .

Add 14 to both sides to undo the subtraction.

Check $k - 14 \stackrel{?}{=} 35$

$$\begin{array}{r} 49 - 14 \stackrel{?}{=} 35 \\ 35 = 35 \checkmark \end{array}$$

Substitute 49 for k in the equation. 49 is the solution.

$$15t = 75$$

$$\frac{15t}{15} = \frac{75}{15}$$

$$t = 5$$

t is multiplied by 15.

Divide both sides by 15 to undo the multiplication.

Check $15t \stackrel{?}{=} 75$

$$\begin{array}{r} 15(5) \stackrel{?}{=} 75 \\ 75 = 75 \checkmark \end{array}$$

Substitute 5 for t in the equation. 5 is the solution.

$$\frac{a}{12} = 8$$

$$12 \cdot \frac{a}{12} = 8 \cdot 12$$

$$a = 96$$

a is divided by 12.

Multiply both sides by 12 to undo the division.

Check $\frac{a}{12} \stackrel{?}{=} 8$

$$\frac{96}{12} \stackrel{?}{=} 8$$

$$8 = 8 \checkmark$$

Substitute 96 for a in the equation.

96 is the solution.

Solving for x can be challenging and exciting. Encourage the student to practice making up different whole number equations and challenge each other to see who solves them more quickly.

Sincerely,