InsightMath

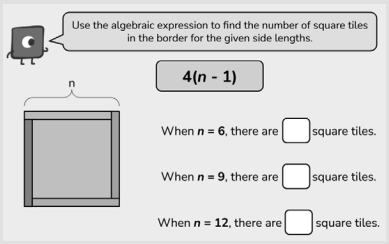
Discovering Algebraic Expressions

Family Guide | Grade 6 | Unit 1

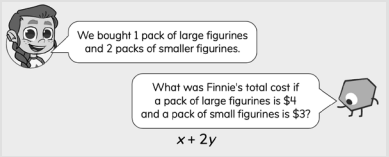
Your student is exploring how algebra is a way of expressing generalizations.

Key Math Ideas

In this unit, your student will expand their understanding of numbers and operations while exploring algebraic expressions. Building on their experience using letters to represent unknown values in equations, they recognize that variables can show changing values. They will connect their knowledge of operations with numbers to working with variables, realizing that the same math rules apply. Students will write expressions with one or two variables to represent patterns and real-world situations.

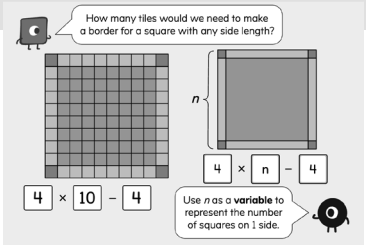


Later in the unit, students will explore exponents as repeated multiplication, recognizing how a variable can also be squared. They identify and combine like terms and begin to recognize equivalent expressions using certain mathematical rules. Throughout the unit, they will evaluate expressions by substituting values for variables, recognizing that any time the same variable is in an expression, the same number can replace it in order to find the value of the expression.



→ In the first half of the unit, your student will learn to

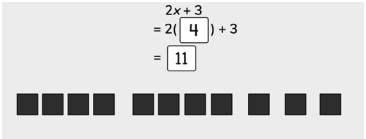
- write numerical and algebraic expressions with one or two variables to represent models, patterns and real world situations;
- use algebra tiles to represent situations involving one or two variables, and model substituting a value for the variable in an expression, as shown in the example to the right ($2x + 3$);
- define the variable(s) in algebraic expressions by stating what the variable represents and describe that any value can replace a variable;
- substitute numbers for variables in an algebraic expressions with one or two variables and find the value of the expression, working with numbers only.

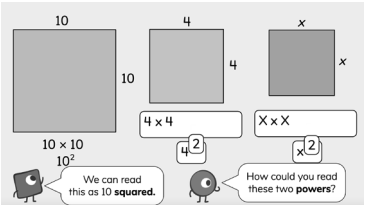


Numerical expression on the left. Algebraic expression on the right.

→ In the second half of the unit, your student will learn to

- recognize that numbers and variables can be added or multiplied in any order without changing the result, such as how $2(4y)$ and $(2 \times 4)y$ are equivalent and $3x + 5$ and $5 + 3x$ are equivalent; $4 \times 4 \times 4 = 4^3$ and read it as "four to the third power;"
- combine like terms to simplify algebraic expressions and identify equivalent expressions involving one or two variables, such as adding $3x + 2x$ as $5x$;
- substitute numbers for variables in expressions with exponents and find the value.

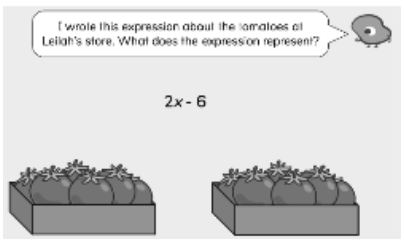




We read 3^2 as "three squared" because it can help us find the area of a square with side lengths of 3.

Helpful Hint

Students may define the variable as an object rather than the quantity of the object. For example writing or saying "x = tomato" rather than "x = the number of tomatoes." To help with this, have your student describe what the variable represents in words and in written form, recognizing that it represents a quantity.



Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ Throughout the unit:

- How can you write expressions that work for many situations?
- How can you use algebraic expressions to represent the real world?
- How can you use mathematical language to talk about expressions?
- How can you represent situations with more than one variable?

→ By the end of the unit:

- How are multiplication and exponents alike? How are they different?
- How does knowing the rules for adding and multiplying with numbers help you with expressions with variables?
- How do you know if terms are like terms or unlike terms?
- How can you combine like terms?

If...	Try...
your student mixes up the roles of the base and exponent in a power, such as while calculating 35 , they express it as $35 = 3 \times 5$ or $35 = 5 \times 5 \times 5 \ldots$	reminding your student about the meaning of exponential notation. Ask them the value and meaning of an expression they are likely familiar with, such as $3^2 = 3 \times 3$, then ask them to apply it to a similar expression, such as $3^5 = 3 \times 3 \times 3 \times 3 \times 3$.

Student Strengths Spotlight

I take time to understand the problem and look for entry points.	Students practice making sense of expressions with variables before simplifying or substituting in values for the variables. This allows them to consider what to do before acting.
I ask my classmates to clarify their reasoning, and then I explain why I agree or disagree.	In this unit, students have opportunities to analyze expressions and share whether they agree or disagree about whether like terms were combined correctly or not. This allows them to reflect and deepen their understanding.
I am precise with the words I use to explain thinking.	Students need to be precise when defining variables to accurately tell what they represent.
I use math to represent real-life situations, and I create contexts to match the given math.	Representing patterns and real-world situations with variables is a focus of this unit, allowing students to make necessary connections to solidify their understanding.

Try This Together!

- **Combining Like Terms Game.** Write terms with and without variables on sticky notes, such as 3, $5x$, $8y$, $2x$, etc. Hide the sticky notes around the house and have your student find two at a time. Ask, "Are those like terms or unlike terms? How do you know?" Support your student to recognize that terms like $5x$ and $2x$ are like terms because they both have the variable x, and in the same expression x represents the same thing. However, $8y$ and $2x$ are not like terms because one includes the variable y and the other includes x, and in the same expression x and y could represent different things.
- **Real-World Variables.** Look for opportunities for your student to represent real-world situations with variables. For example, when purchasing items at the store the total cost will be determined by the cost of each item or the number of items purchase. If each notebook costs \$2, have your student write an expression to represent the cost of any number of notebooks ($2n$). If you have a coupon for \$1 off the total cost of notebooks, revise the expression ($2n - 1$). Have your student practice substituting in a value for the variable by asking "What would the total cost be for 5 notebooks? 8 notebooks?"