Shell Education

Full-color Teacher Resource CD

Leveled Texts for Mathematics

Algebra and Algebraic Thinking

Table of Contents

How to Use This Product

Readability Chart

Title of the Text	Star	Circle	Square	Triangle
Various Variables	1.7	3.4	5.0	6.5
Shaping Up	2.0	3.1	5.0	6.5
Sometimes the Change Is Consistent	2.2	3.0	5.0	6.5
Sometimes the Change Changes	2.0	3.4	5.0	6.6
It's All Organized	2.2	3.4	5.0	6.5
Express It Mathematically	2.2	3.0	5.0	6.7
Expressing More…Mathematically	1.9	3.3	5.0	6.5
Many Ways to Look at It	2.2	3.2	5.0	6.6
Adding Some Balance	1.7	3.5	5.1	6.5
Keeping the Balance When Taking Away	1.8	3.0	5.0	6.5
The Equations Keep Multiplying	2.2	3.3	5.0	6.5
Equation Writing	2.2	3.4	5.0	6.5
Everything Has a Place	1.9	3.1	5.3	6.5
Moving Around	2.1	3.5	5.1	6.6
In a Group	2.1	3.2	5.5	6.6

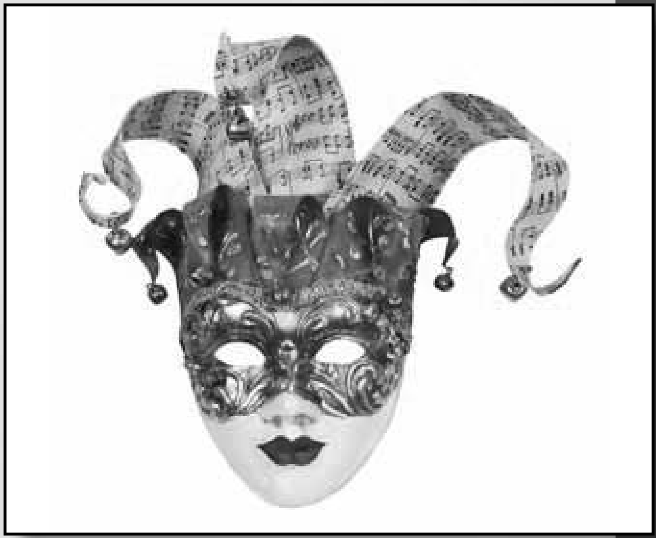
Components of the Product

Strong Image Support

- Each level of text includes multiple primary sources. These documents, photographs, and illustrations add interest to the texts. The images also serve as visual support for second-language learners. They make the texts more context-rich and bring the examples to life.

Expressing More…Mathematically

Who uses mathematical expressions? Many people! People who work in stores do. Even people who work in costume shops do!



A costume shop gets sent 12 boxes. Each box has 6 masks. How many masks did the store get?

Basic Facts

What is a **mathematical expression**? Do you remember? It is any group of **numbers**, **variables**, and **operations**. You have worked with them before. Some use addition. Some use subtraction. You have worked with those. They can use multiplication, too. They can even use division.

How did you solve the problem? You may have written 6×12. This would show that the store got 72 masks. You just wrote an expression.

Let's say the shop gets 12 boxes one week. The next week, they get 5 boxes. Then they get 17 boxes the next week. The last week, they get 10 boxes. We can show the number of masks they got:

6×12	Week 1, with 12 boxes
6×5	Week 2, with 5 boxes
6×17	Week 3, with 17 boxes
6×10	Week 4, with 10 boxes

Each time we show *6 × the number of boxes.*

A variable is a symbol. It is used in place of a number.

Let n = the number of boxes the store got. Then, *6 × the number of boxes* may be written as $6 \cdot n$. Or it can be written $6(n)$, or $6n$. Each is an expression. So are the others. Each shows the number of masks when n boxes are present.

Using Tables

Tables can show expressions. You have seen them used for addition. They can be used for subtraction. And for multiplication. And for division, too. It does not matter what the operation is. We use **substitution** to solve. We are given a value for *n*. We use that value *in place of n*.

Number of Boxes (*n*)	1	2	3	10
Showing Work 6•*n*	6(1)	6(2)	6(3)	6(10)
Number of Masks (6*n*)	6	12	18	60

or

Number of Boxes (*n*)	1	2	3	4	5	10	12	15	17	101
Number of Masks (6*n*)	6	12	18	24	30	60	72	90	102	606

Determining Expressions

Look at the table below. Let the input be *k*. What goes in the output?

Input	3	6	15	21	30	60	69	300	*k*
Output	1	2	5	7	10	20	13	100	

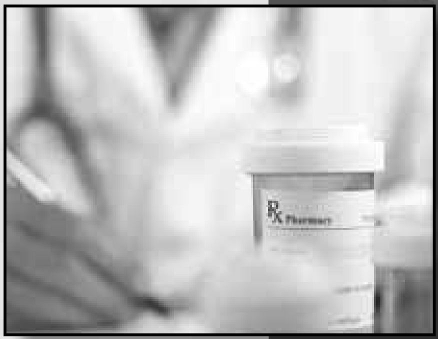
You need to figure something out. You need to know what to do to the input to get the output.

When	Input	3	We know 3 – 2 = 1
Then	Output	1	We know 3 ÷ 3 = 1

When	Input	6	We know 6 – 4 = 2
Then	Output	2	We know 6 ÷ 3 = 2

What did you notice? Both times *input ÷ 3 = output*. Check the other pairs. Try 15 and 5. See that 15 ÷ 3 = 5. Check 60 and 20. See that 60 ÷ 3 = 20. Check each input/output pair. We see that *input ÷ 3 = output* every time. Let *k* be the input. Then *k ÷ 3* goes in the output. It goes in the table. Write *k ÷ 3* in the blank.

Expressions in Our Daily Lives



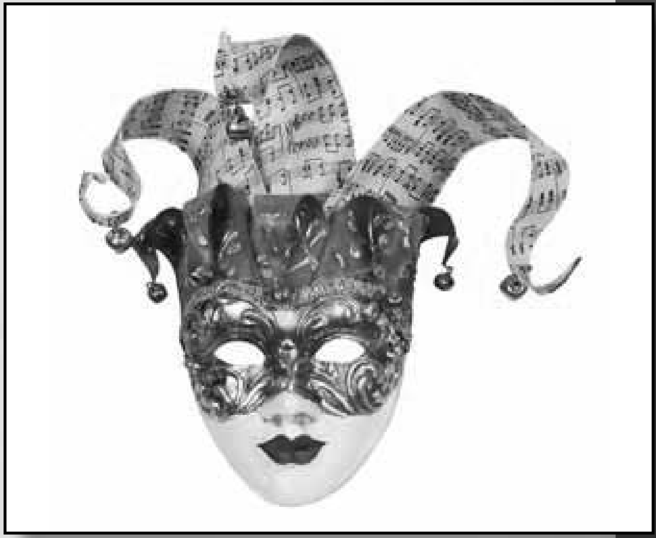
How much medicine do you need? What if your mom is sick? How much does she need? Doctors use expressions. This helps them know. This keeps people safe. They find a person's weight. This tells them how much the person needs. Sometimes a weight is given in kilograms. It must be changed to pounds. Expressions help with these conversions.

You Try It

Fill in the table.

Input	2	3	5	8	9	10	12	*m*
Output	12	18	30	48	54			

Expressing More…Mathematically



Who uses mathematical expressions? Many people! Even people who work in costume shops do!

A costume shop gets sent 12 boxes. Each box has 6 masks. How many masks did the store get?

Basic Facts

What is a **mathematical expression**? It is any group of **numbers**, **variables**, and **operations**. You have worked with expressions before. Some use addition. And you have used some that had subtraction. They can use multiplication, too. They can even use division.

How did you solve the problem above? You may have written 12×6. This would let you know that the store got 72 masks. You just wrote an expression.

Let's say the shop gets 12 boxes one week. The next week, they get 5 boxes. The third week, they get 17. Finally, the fourth week they get 10 boxes.

We can show the number of masks they got:

6×12	Week 1, with 12 boxes
6×5	Week 2, with 5 boxes
6×17	Week 3, with 17 boxes
6×10	Week 4, with 10 boxes

Each time we show *6 × the number of boxes.*

A variable is a symbol. It is any symbol used to show a number.

Let n = the number of boxes the store got. Then *6 × the number of boxes* is $6n$. Or it can be written $6 \cdot n$, $6(n)$, or $6n$. Each is an expression. Each shows the number of masks when n boxes are present.

Using Tables

Tables can show expressions. You have seen them used for addition. They can be used for subtraction. They can be used for multiplication, too. And they can be used for division. It does not matter what the operation is. We use **substitution** to solve. We are given a value for *n*. We use that value *in place of n*.

Number of Boxes (n)	1	2	3	10
Showing Work $6 \bullet n$	6(1)	6(2)	6(3)	6(10)
Number of Masks ($6n$)	6	12	18	60

or

Number of Boxes (n)	1	2	3	4	5	10	12	15	17	101
Number of Masks ($6n$)	6	12	18	24	30	60	72	90	102	606

Determining Expressions

Look at the table below. Let the input be *k*. What expression goes in the output?

Input	3	6	15	21	30	60	69	300	k
Output	1	2	5	7	10	20	13	100	

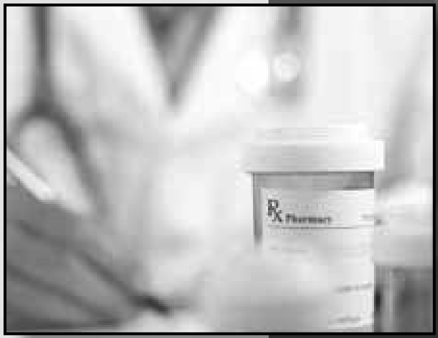
Figure out what you need to do to the input to get the output.

When	Input	3	We know 3 – 2 = 1
Then	Output	1	We know 3 ÷ 3 = 1

When	Input	6	We know 6 – 4 = 2
Then	Output	2	We know 6 ÷ 3 = 2

What did you notice? Both times *input ÷ 3 = output*. Check the other pairs. In checking 15 and 5. We see that 15 ÷ 3 = 5 in checking 60 and 20 we see that 60 ÷ 3 = 20. If we check each input/output pair, we see that *input* ÷ 3 = *output* in every case. So if *k* is the input, then *k ÷ 3* goes in the table for the output. Write *k ÷ 3* in the blank.

Expressions in Our Daily Lives



How much medicine is needed? Doctors use expressions to help them know. Sometimes they must multiply. They may take a person's weight times a given number. They do this to find out how much medicine to give. Sometimes a weight is given in kilograms. It must be changed to pounds. Sometimes a height is given in inches. It must be changed to centimeters. Expressions help us know.

You Try It

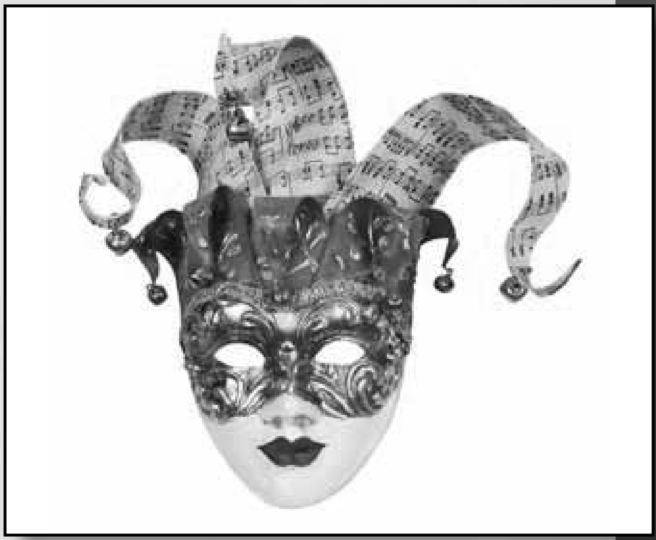
Complete the table.

Input	2	3	5	8	9	10	12	m
Output	12	18	30	48	54			

Expressing More…Mathematically

Did you know people who work in costume shops use mathematical expressions?

A costume shop receives a shipment of 12 boxes. Each box contains 6 masks. How many masks did the store receive?



Basic Facts

Remember that a **mathematical expression** is any group of **numbers**, **variables**, and **operations**. You know expressions use addition and subtraction. Expressions can also use multiplication. They can even use division.

Did you write 12×6 to see that 72 masks were received? You wrote an expression.

Let's say the shop gets 12 boxes the first week. The second week, the shop gets 5 boxes. The third week, the shop gets 17 boxes. The fourth week, the shop gets 10 boxes.

We can show the number of masks received with:

6×12	Week 1, with 12 boxes
6×5	Week 2, with 5 boxes
6×17	Week 3, with 17 boxes
6×10	Week 4, with 10 boxes

Each time we show *6 × the number of boxes.*

Remember that a variable is any symbol used to show a number.

If we let n = the number of boxes received, *6 × the number of boxes* may be rewritten as $6n$, or $6 \cdot n$, or $6(n)$. The expression $6n$ shows the number of masks received when n boxes are received.

Using Tables

Addition and subtraction expressions can be used in tables. Multiplication and division expressions can also be used in tables. No matter what the operation may be, we use **substitution** to solve. We are given a value for *n,* and we use that value *in place of n*.

Number of Boxes (*n*)	1	2	3	10
Showing Work 6•*n*	6(1)	6(2)	6(3)	6(10)
Number of Masks (6*n*)	6	12	18	60

or

Number of Boxes (*n*)	1	2	3	4	5	10	12	15	17	101
Number of Masks (6*n*)	6	12	18	24	30	60	72	90	102	606

Determining Expressions

Look at the table below. What expression goes in the output when the input is *k*?

Input	3	6	15	21	30	60	69	300	*k*
Output	1	2	5	7	10	20	13	100	

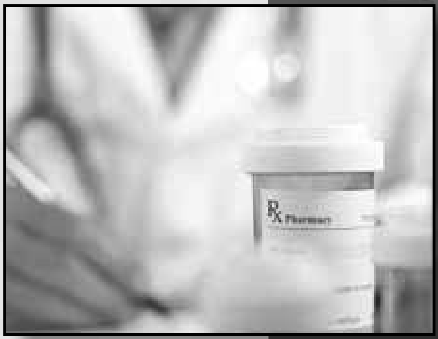
What do you need to do to the input to get the output.

When	Input	3	We know 3 – 2 = 1
Then	Output	1	We know 3 ÷ 3 = 1

When	Input	6	We know 6 – 4 = 2
Then	Output	2	We know 6 ÷ 3 = 2

Did you notice that both times *input ÷ 3 = output*? Check the other pairs. When we check 15 and 5, we see that 15 ÷ 3 = 5. When we check 60 and 20, we see that 60 ÷ 3 = 20. In fact, if we check each input/output pair, we see that *input* ÷ 3 = *output* in every case. So if *k* is the input, then *k ÷ 3* goes in the table for the output. Write *k ÷ 3* in the blank.

Expressions in Our Daily Lives



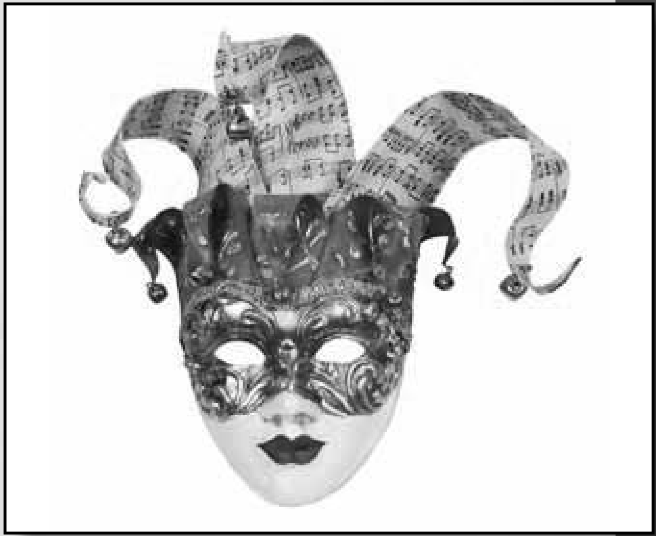
How much medicine do we take? Doctors use expressions to answer that question. Sometimes they need to multiply a person's weight with a dose amount. Then they know how much medicine to give. Sometimes we change a weight in kilograms to pounds. Sometimes we change a height in inches to centimeters. Expressions help with these tasks.

You Try It

Complete the table.

Input	2	3	5	8	9	10	12	*m*
Output	12	18	30	48	54			

Expressing More…Mathematically



Did you know people who work in costume shops use mathematical expressions?

A costume shop receives a shipment of 12 boxes. Each box contains 6 masks. How many masks did they receive in all?

Basic Facts

Remember that a **mathematical expression** is any group of **numbers**, **variables**, and **operations**. You have worked with expressions that use addition and subtraction, but expressions can also use multiplication and division.

You may have written 12×6 to figure out that 72 masks were received. You just wrote an expression.

Let's say the shop gets 12 boxes the first week. The second week the shop gets 5 boxes. The third week the shop gets 17 boxes, and finally, the fourth week, the shop gets 10 boxes.

We can show the number of masks received with these expressions:

6×12	Week 1, with 12 boxes
6×5	Week 2, with 5 boxes
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Each time we show *6 × the number of boxes.*

Remember that a variable is any symbol used to represent a number.

If we let n = the number of boxes received, *6 × the number of boxes* may be rewritten as $6n$, or $6 \cdot n$, or $6(n)$. The expression $6n$ shows the number of masks received when n boxes are received.

Using Tables

Addition and subtraction expressions can be used in tables. Multiplication and division expressions can also be used in tables. No matter what the operation may be, we use **substitution** to solve the expression. We are given a value for *n* and we use that value *in place of n*.

Number of Boxes (*n*)	1	2	3	10
Showing Work 6•*n*	6(1)	6(2)	6(3)	6(10)
Number of Masks (6*n*)	6	12	18	60

or

Number of Boxes (*n*)	1	2	3	4	5	10	12	15	17	101
Number of Masks (6*n*)	6	12	18	24	30	60	72	90	102	606

Determining Expressions

Consider the table below. What expression goes in the output when the input is *k*?

Input	3	6	15	21	30	60	69	300	*k*
Output	1	2	5	7	10	20	13	100	

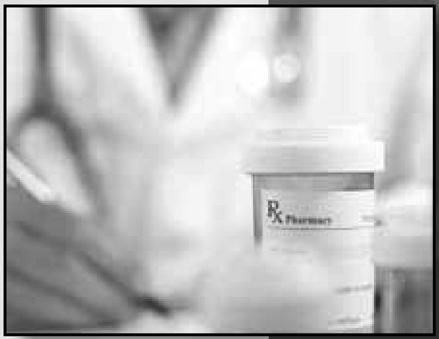
Determine what you need to do to the input to get the output.

When	Input	3	We know 3 – 2 = 1
Then	Output	1	We know 3 ÷ 3 = 1

When	Input	6	We know 6 – 4 = 2
Then	Output	2	We know 6 ÷ 3 = 2

Did you notice that both times *input ÷ 3 = output*? Check the other pairs based upon the data available.. In checking 15 and 5, we see that 15 ÷ 3 = 5, and in checking 60 and 20, we see that 60 ÷ 3 = 20. In fact, if we verify each input/output pair, we see that *input ÷ 3 = output* in every case. So if *k* is the input, then *k ÷ 3* goes in the table for the output. Write *k ÷ 3* in the blank.

Expressions in Our Daily Lives



How much medicine is required to treat a sick patient? Doctors use expressions to determine those amounts. Sometimes they must multiply a person's weight with an established dose in order to determine how much medicine to give. Sometimes a weight in kilograms must be converted to pounds, or a height in inches must be converted to centimeters. Expressions help with each of those tasks.

You Try It

Complete the table.

Input	2	3	5	8	9	10	12	*m*
Output	12	18	30	48	54			

