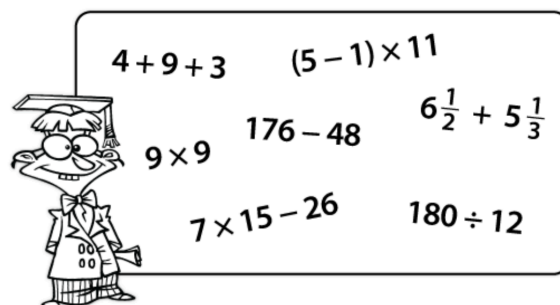


Lesson 4: Exponents and Order of Operations (3 Days)

☐ Getting Started

Most math problems are shown in a form that is called a mathematical expression. A

mathematical expression is simply a math sentence that includes at least two numbers and one or more operators (+, -, ×, ÷). The image that follows shows several examples of expressions.



In working with expressions, you've learned the rules and steps for solving problems for each of the four operations: addition, subtraction, multiplication, and division. There are also rules for the order in which the operations should be performed. This process is called the order of operations. The **order of operations** is a set of rules that defines the order in which to complete operations when solving a mathematical expression.

This may be review for you, but it's a good idea to practice order of operations further to make sure you know the correct way to solve multi-operation problems. Being able to correctly and confidently use the order of operations is an important skill in problem solving, including the higher math levels you'll explore in coming years. You will revisit the skill later in this level when you are introduced to algebra concepts.

Stuff You Need

- 3-hole drilled card stock (kit)
- colored pencils
- colored pencils* (Activity 1 - optional)
- glue or glue stick
- Interactive Notebook
- number cards (kit)
- scissors
- symbol cards (kit)

Ideas to Think About

- Why are mathematical notations useful in writing math expressions?
- What does an exponent indicate should be done mathematically?
- How does the order of operations lead to the correct answer for a problem?

Things to Know

- **Mathematical expression:** a math sentence that includes at least two numbers and one or more operators (+, -, ×, ÷)
- **Order of operations:** a set of rules that define the order in which to complete operations when solving a mathematical expression

- An exponential expression contains two parts — a base and an exponent.
- The **base** of an exponential expression is a factor, and the **exponent** indicates how many times to use that base as a factor.
- A **notation** is a shorthand way of writing something. For example, 3^4 is a shorter way to write $3 \times 3 \times 3 \times 3$.

Activities

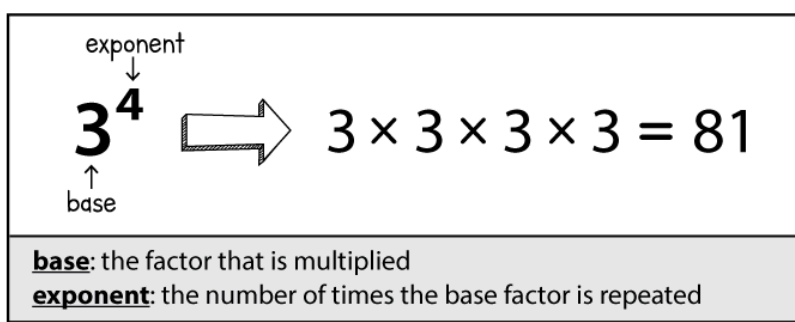
☐ Activity 1: What is an Exponent?

First of all, what is an exponent? To start, look carefully at the two expressions that follow:

Expression	Translation	Solution
3×4	three times four	12
3^4	three to the power of four	81

The first expression shows the factors 3 and 4 multiplying together to get a product of 12.

The second expression is also a multiplication problem. It can be read as "three to the power of four" or "three to the fourth power." The product of this expression is 81. How does 81 come from 3 and 4? This expression cannot be solved by multiplying the two numbers together. You see two numbers, just like the first expression, but the numbers have different roles.



The expression 3^4 is called an *exponential expression*. The 3 is called the base and the 4 is called the exponent. The **base** of an exponential expression is a factor, and the **exponent** tells how many times you're going to use that base as a factor. In the example, the factor 3 is multiplied by itself 4 times. In expanded form, the problem reads

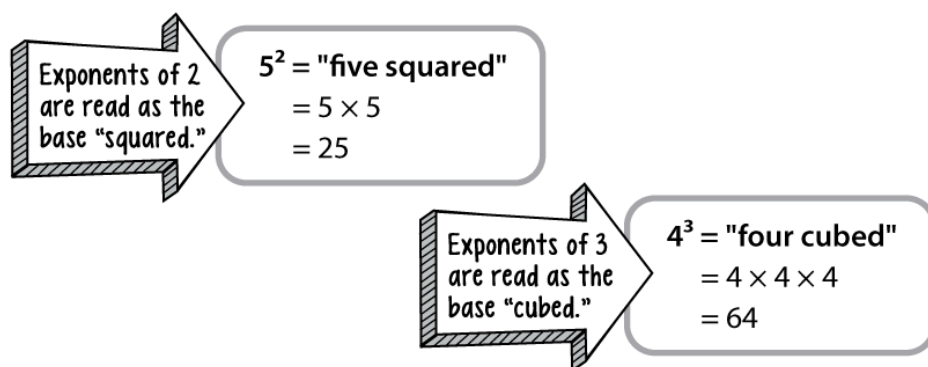
$$3 \times 3 \times 3 \times 3$$

To solve, just multiply the factors together like any other multiplication problem. Don't forget that you can use the multiplication properties as you work. The associative property, for example, allows you to group factors together in parentheses, which makes solving quicker and easier:

$$(3 \times 3) \times (3 \times 3) = 9 \times 9 = 81$$

An exponential expression is a fine example of what is called a mathematical notation. A **notation** is a shorthand way of writing something. While the expanded form of 3^4 isn't really that long ($3 \times 3 \times 3 \times 3$), imagine how long the expanded form of something like 7^{50} would be! Being able to write an expression in a more concise notation can really be useful.

Just as you read above, exponential expressions are read by identifying the base and saying it is raised to the power shown by the exponent. So, 5^6 is read as "five to the power of 6" or "five to the sixth power," and 10^{12} is read as "ten to the power of twelve" or "ten to the twelfth power." There are two special words you need to know when the numbers 2 and 3 are used as exponents:



Exponents are also used to write powers of ten. You remember that we used powers of ten in Lesson 2 to quickly and easily multiply decimal numbers. Powers of ten are simply the factor 10 multiplied by itself a certain number of times. For example, 1,000 is $10 \times 10 \times 10$. Can a problem like that be written in exponential notation? You better believe it! We can write 1,000 as 10^3 .

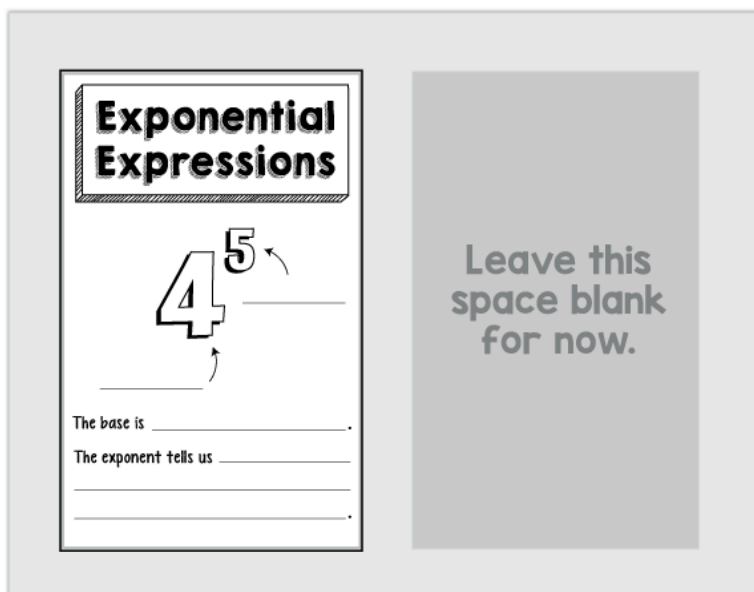
An easy trick to write powers of ten in exponential notation is to count the number of zeros. That number is the exponent for the base of 10. You can see a few examples in the following image.

The opposite is also true. You can easily expand a power of ten shown in exponential notation by writing a 1 followed by the number of zeros shown by the exponent. So, 10^8 is written as 100,000,000.

For this activity, you're going to create a booklet about exponents for your Interactive Notebook. This booklet will form the first part of a page that you'll complete later in the lesson. To create the booklet, follow these steps:

$$\begin{array}{l} 10 \longrightarrow 10^1 \\ 100 \longrightarrow 10^2 \\ 1,000 \longrightarrow 10^3 \\ 10,000 \longrightarrow 10^4 \\ 100,000 \longrightarrow 10^5 \end{array}$$

1. Cut out the box from the second "Exponential Expressions" page along the dotted lines and then fold it in half along the solid line to make a small booklet.
2. Cut out the box from the first "Exponential Expressions" page. In that box, label the base and exponent and color them with colored pencils. Complete the definitions for each.
3. Glue the box to outside of the booklet as a cover page.
4. Open the booklet. Use colored pencils to color in the bases and exponents in the first column. Then complete the information in the remaining columns for each expression.
5. When you're finished, glue the back of the booklet to the left side of piece of card stock that is turned sideways. You will add another foldable to this page in a later activity. (Refer to the following image.)



☐ Activity 2: Writing and Evaluating Exponential Expressions

In this activity, you will be writing and evaluating exponential expressions.

Remember that exponents are a special form of multiplication. The two numbers are

not merely multiplied as factors but show a different relationship.

The exponent tells the number of times the base number is repeated as a factor. Just like you learned while making the booklet, when you see the words "to the power of," you know an exponent is required. Don't forget to watch for the special words "squared" and "cubed."

Evaluating an expression means to solve it. To do this, you can write the exponential expression in expanded form and multiply. For example, 5^3 means $5 \times 5 \times 5$, which equals 125. Two interesting exponents you may see are 1 and 0:

- Any base factor raised to the power of 1 is simply that base factor. So 8^1 is 8 because the one shows the base is only used one time.
- Any base factor raised to the power of 0 is equal to 1. So 6^0 is equal to 1. You'll learn the reason for this rule later, but for now it's a good fact to simply memorize.

You can also solve mathematical problems that involve more than one exponential expression. Simply find the value of each exponential expression and then perform the operation (add, subtract, multiply, or divide) shown in the problem. Using parentheses to expand and solve the exponential expressions can help you stay organized as you solve the problem.



$4^2 + 3^3 =$
$4^2 + 3^3 =$
$(4 \times 4) + (3 \times 3 \times 3) =$
$16 + 27 =$
43

Practice writing and evaluating exponents by completing the "Exponential Expressions" activity page.

Day 2

☐ Activity 3: Order of Operations

You've probably worked with order of operations before, but it's so important to problem solving in math that it's worth reviewing. You'll also learn a few additional facts about the order of operations in this lesson. Begin by watching the video at the following web link.

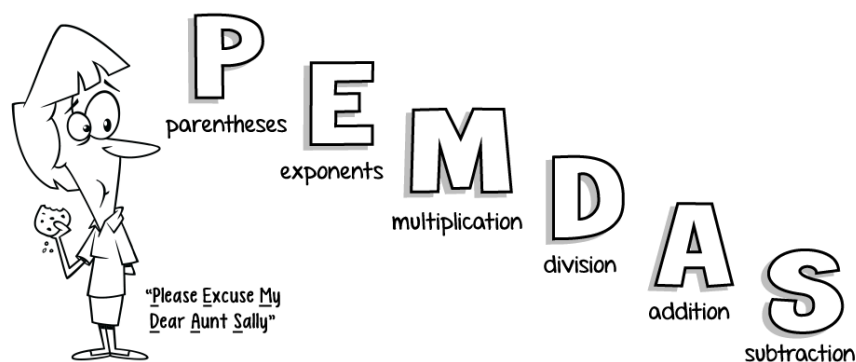


Math Antics: Order of Operations
www.beyondthepage.com/link/10064/

Next, apply what you learned in the video to complete the "Order of Operations Notes" pages. You may rewatch the video if needed to get your information. You can also solve the order of operations problems using hands-on learning, if you prefer. Your math kit includes number cards and symbols cards. You can use these cards to represent each problem, moving and/or replacing cards as you work through the order of operation steps.

☐ Activity 4: Using PEMDAS to Evaluate Expressions

Please Excuse My Dear Aunt Sally. What did Aunt Sally do? Nothing, other than help us remember the correct order for solving multiple operations. If you put the first letters of the phrase together, you get the acronym PEMDAS, which can be used as a way to remember the order of operations.



The video you watched didn't mention PEMDAS as a way to remember the order of operations, but the steps used are the same. There are also a few other facts about the order of operations that you need to understand.

In PEMDAS, the first step is commonly called "parentheses," but it's interesting to note that this step actually includes all grouping symbols. Common grouping symbols used in math include parentheses () and brackets []. Another type of grouping symbol that you may see are braces { }. Any operations that are grouped using one of these symbols should be solved first.

$$(4 + 3) \times 9$$



$$7 \times 9$$



$$63$$

Sometimes a mathematical expression uses nested grouping symbols. This means that one grouping symbol contains another grouping symbol inside it. To solve an

expression with nested grouping symbols, always work from the inside to the outside. The operation shown in the innermost grouping symbol is solved first.

Typically, the innermost symbol is parentheses. From there, move outward to solve the operation shown in the next grouping symbol. Follow the "inside to outside" process in the example that follows:

$$\begin{array}{lcl}
 4 \times \{13 + [9 - (6 + 1) + 2]\} & \longleftarrow & \text{Solve the innermost grouping: } (6 + 1) \\
 4 \times \{13 + [9 - 7 + 2]\} & \longleftarrow & \text{Work outward to the next grouping: } [9 - 7 + 2] \\
 4 \times \{13 + 4\} & \longleftarrow & \text{Solve the final grouping: } \{13 + 4\} \\
 4 \times 17 & & \\
 68 & &
 \end{array}$$

The next step in the order of operations is exponents. Remember that the exponent tells how many times to multiply the base by itself. An interesting thing about exponents is that they can show up in different places in the expression. Compare these examples:

EXAMPLE 1: exponent with a base number

$$6^2 + 5 \longrightarrow 36 + 5 \longrightarrow 41$$

EXAMPLE 2: exponents inside grouping symbols

$$9 \times (5^3 - 10^2) \longrightarrow 9 \times (125 - 100) \longrightarrow 9 \times 25 \longrightarrow 225$$

EXAMPLE 3: exponent attached to a grouping symbol

$$(5 - 3)^4 \longrightarrow (2)^4 \longrightarrow 16$$

In the first example, the exponent is shown on its own and is evaluated before other operations are performed.

In the second example, the exponents are shown on base numbers inside the parentheses. The parentheses show you where to start your calculations, and those calculations can include exponents, so evaluate the ones inside the parentheses before performing any other operations.

In the third example, the exponent is attached to the grouping symbol. This shows that you need to solve the operation inside the grouping symbol first and then apply the exponent.

Finally, don't forget multiplication and division are done in the same step, in order from left to right. These operations are calculated before addition and subtraction. Then addition and subtraction are also done in the same step, from left to right.

Now continue your practice with the order of operations by solving the problems on the "PEMDAS: Order of Operations" activity pages. Don't forget that you can use your number and symbol cards if they help you more easily solve these types of problems.

Day 3

☐ Activity 5: Order of Operations Foldable

Now that you've reviewed the order of operations and learned a few new facts about it, you'll make a foldable to add to the page you started in Activity 1. Follow these directions to create your foldable:

1. Cut out the large rectangle along the dotted lines. Be sure to carefully cut around the tab on the upper side of the rectangle. Fold the rectangle in half along the solid line.
2. Use colored pencils to color each letter of the order of operations a different color.
3. Cut along the dotted lines to create flaps.
4. Cut out the example problem and glue it to the front of the tab along the top of the foldable.
5. Use the order of operations to solve the example problem. Lift the flap for each step and, underneath the flap, show that step being used to solve the problem.
6. Put glue on the back of the foldable and paste it on the right side of the piece of cardstock that has the exponents booklet. (Refer to the following image.)
7. Cut out the title box and color it as desired. Paste the title above your foldable.
8. Store the page in your Interactive Notebook for future reference.

Exponential Expressions

The base is _____.

The exponent tells us _____.

Order of Operations

$7 + 5 \times 2^3 \div (9 - 4)$

P
(PARENTHESES AND OTHER GROUPING SYMBOLS)

E
(EXPONENTS)

M & D
(MULTIPLICATION AND DIVISION, FROM LEFT TO RIGHT)

A & S
(ADDITION AND SUBTRACTION, FROM LEFT TO RIGHT)

☐ Activity 6: Quiz

Time for a quiz! Use what you've learned thus far in this unit to complete the "Unit 1 Quiz" pages. You may use scratch paper if you need more room to work.

Wrapping Up

In this lesson you reviewed exponents and the order of operations and added more complex information about these ideas. You are laying a strong foundation of math knowledge. Next, you'll learn more about factors and the ways they can be used in problem solving.

If you'd like more practice (and some fun) with the order of operations, you may wish to play the game at the following web link.



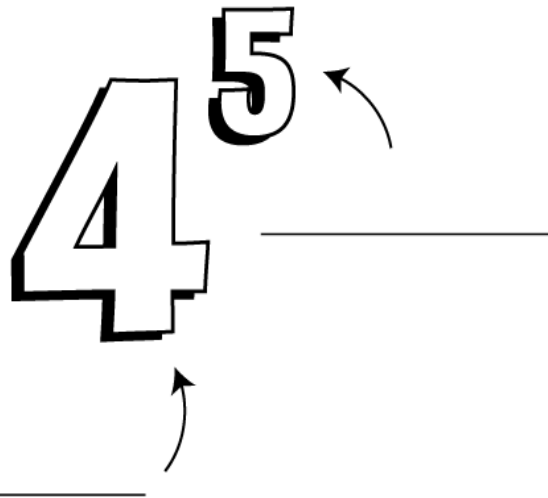
Order of Operations Escape

www.beyondthepage.com/link/10049/

Learning Gates

Take the [Learning Gates quiz](#) for this lesson.

Exponential Expressions



The base is _____.

The exponent tells us _____

_____.

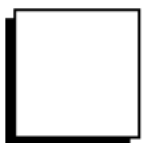
EXPONENTIAL EXPRESSION		EXPANDED FORM		FINAL VALUE		HOW TO SAY IT	
6^1						SIX TO THE FIRST POWER OR SIX TO THE POWER OF ONE	
4^3						FOUR TO THE THIRD POWER OR FOUR CUBED	
8^2						EIGHT TO THE SECOND POWER OR EIGHT SQUARED	
2^5						TWO TO THE FIFTH POWER OR TWO TO THE POWER OF FIVE	
5^4						FIVE TO THE FOURTH POWER OR FIVE TO THE POWER OF FOUR	
10^6						TEN TO THE SIXTH POWER OR TEN TO THE POWER OF SIX	

Exponential Expressions



Instructions: Write each expression using exponential notation.

①



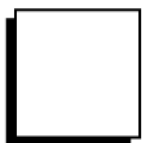
4 to the
power of 5

②



a base of 5 used as
a factor 8 times

③



$3 \times 3 \times 3 \times 3 \times 3 \times 3$

④



12 multiplied by
itself 3 times

⑤



25 squared

Instructions: Evaluate each exponential expression. You may want to expand the expression before solving.

⑥

$2^8 = \underline{\hspace{2cm}}$

⑦

$\text{four cubed} = \underline{\hspace{2cm}}$

⑧

$95^0 = \underline{\hspace{2cm}}$

⑨

$5^2 + 6^1 = \underline{\hspace{2cm}}$

⑩

$8^2 - 3^3 = \underline{\hspace{2cm}}$



Order of Operations Notes

The Order of Operations

First: _____

Second: _____

Third: _____

Fourth: _____

Rules:

1. Parentheses () and brackets [] show which operations and calculations to do _____.
If a problem has more than one set of grouping symbols, do all the calculations (inside / outside) the parentheses or brackets before the non-grouped operations.

$$\text{Example: } (9 + 2) \times (7 - 4) \rightarrow 11 \times 3 \rightarrow 33$$

2. Exponents are a way to show repeated _____. They are solved (before / after) parentheses and brackets, but (before / after) the other operations.

$$\text{Example: } 8 + 4^2 \rightarrow 8 + 16 \rightarrow 24$$

3. Multiplication and division are done _____ addition and subtraction.

$$\text{Example: } 15 + 12 \div 3 \rightarrow 15 + 4 \rightarrow 19$$

4. Multiplication and division are equal in the order of operations, so they are calculated in the same step from _____ to _____.

$$\text{Example: } 75 \div 5 \times 3 \rightarrow 15 \times 3 \rightarrow 45$$

5. Addition and subtraction are equal in the order of operations, so they are calculated in the same step from _____ to _____.

$$\text{Example: } 16 - 7 + 5 - 2 \rightarrow 9 + 5 - 2 \rightarrow 14 - 2 \rightarrow 12$$



Apply It!

Find the solutions for each expression using the order of operations rules.

$$6 \times (5 - 2) =$$

$$7^2 \times (3 - 2) =$$

$$24 + 3 \times 3 =$$

$$40 \div 5 \times 4 =$$

$$7 + 5 - 3 + 11 =$$

PEMDAS:

Order of Operations

Instructions: Use the order of operations to solve each problem.



1. $18 - 36 \div 9 \times 4 + 8 = \underline{\hspace{2cm}}$

2. $5 \times [(4 + 2) + 6] - 21 \div 7 \times 3 = \underline{\hspace{2cm}}$

3. $3 \times (4^2 + 5^2) = \underline{\hspace{2cm}}$

4. $(5 + 7)^2 + 9 \times 3 = \underline{\hspace{2cm}}$

5. $(17^1 + 72) - 4 \times [8 + (3^2 - 5)] = \underline{\hspace{2cm}}$

- 6.** Liam has purchased 3 red pencils and 2 blue pencils every week for the last 7 weeks. He has also lost 4 red pencils and 3 blue pencils in the same time. How many pencils does Liam have? Solve the number sentence for the problem.

$$7 \times (3 + 2) - (4 + 3) = \underline{\hspace{2cm}}$$

- 7.** Gina's brother is 4 years old. Gina is five less than the square of her brother's age. How old is Gina? Solve the number sentence for the problem.

$$4^2 - 5 = \underline{\hspace{2cm}}$$

- 8.** Fill in the missing numbers 2, 4, and 5 to make the number sentence true.

$$8 + \underline{\hspace{1cm}} \times (3 + 4) - \underline{\hspace{1cm}} \div 2 + \underline{\hspace{1cm}} = 25$$

- 9.** Fill in the missing numbers 2, 3, and 5 to make the number sentence true.

$$\underline{\hspace{1cm}} + 4 + \underline{\hspace{1cm}}^2 - 5 \times \underline{\hspace{1cm}} = 8$$

- 10.** Fill in the missing numbers 3, 8, and 9 to make the number sentence true.

$$\underline{\hspace{1cm}}^1 + 3 \times (24 - 2^3 \times \underline{\hspace{1cm}}) - 7 + \underline{\hspace{1cm}} = 10$$

$7 + 5 \times 2^3 \div (9 - 4)$

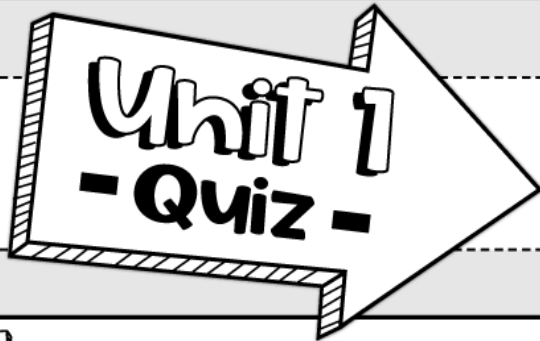
Order of Operations

P
(PARENTHESES AND OTHER GROUPING SYMBOLS)

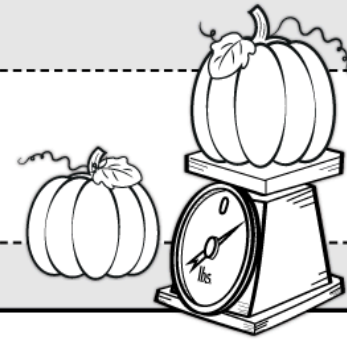
E
(EXPONENTS)

M & D
(MULTIPLICATION AND DIVISION, FROM LEFT TO RIGHT)

A & S
(ADDITION AND SUBTRACTION, FROM LEFT TO RIGHT)

**Instructions:**

Solve each problem.

**1.**

$762.4 + 29.63 =$

2.

$189.2 - 98.46 =$

3.

Bob has 2 pumpkins to enter at the state fair. One pumpkin weighs 17.8 pounds and the other pumpkin weighs 23.15 pounds. What is the total weight of Bob's pumpkins?

4.

Gertie ran her last sprint in 26.2 seconds. If she wants to decrease her time by 4.05 seconds, how fast will she need to run the next sprint?

5.

Match the property to the correct example.

commutative property

associative property

distributive property

$5(3 + 10) = (5 \times 3) + (5 \times 10)$

$(6 \times 4) \times 5 = 6 \times (4 \times 5)$

$25 \times 12 = 12 \times 25$

$$7.3 \times 0.15 =$$

7 Circle the numbers that 45,264 is divisible by.

12

8. Dwayne was paid \$78 for washing 5 cars. If he was paid an equal amount for each car, how much money does Dwayne earn per car wash?

a) Write "seven cubed" in exponential notation and then evaluate the expression.

b) Write "two to the fourth power" in exponential notation and then evaluate the expression.

$$30 - 2^3 \times 3 + [16 \div (3 + 1)] =$$

Lesson 4: Exponents and Order of Operations (3 Days)

Getting Started

✿ Ideas to Think About

- Why are mathematical notations useful in writing math expressions?
- What does an exponent indicate should be done mathematically?
- How does the order of operations lead to the correct answer for a problem?

Things to Know

- **Mathematical expression:** a math sentence that includes at least two numbers and one or more operators (+, -, ×, ÷)
- **Order of operations:** a set of rules that define the order in which to complete operations when solving a mathematical expression
- An exponential expression contains two parts — a base and an exponent.
- The **base** of an exponential expression is a factor, and the **exponent** indicates how many times to use that base as a factor.
- A **notation** is a shorthand way of writing something. For example, 3^4 is a shorter way to write $3 \times 3 \times 3 \times 3$.

• Skills

- Write and evaluate numerical expressions involving whole-number exponents
- Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations)

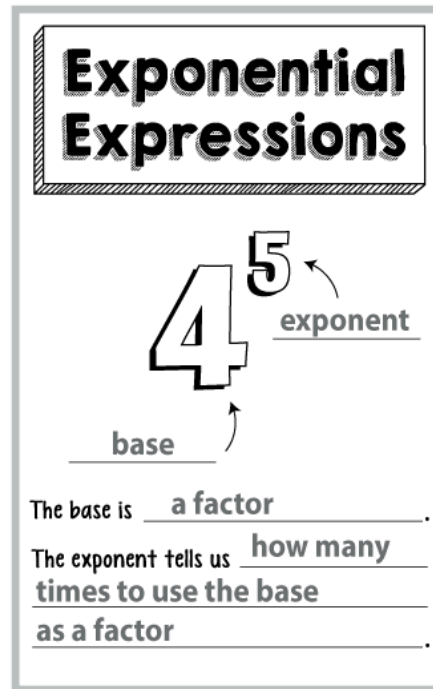
Introducing the Lesson

Your child has most likely been introduced in previous levels to the order of operations, but this concept bears repeated practice, especially as the child prepares for higher levels of math work. The order of operations, which includes computation with exponents, is used extensively in algebra, geometry, and other related math courses. The goal is to have your child be able to use these skills with confidence and fluency as she prepares for these coming concepts.

Activities

Activity 1: What is an Exponent?

Your child will create a booklet for her Interactive Notebook about exponential notation. This booklet will be part of a page that will be completed in a later activity.



- 6^1 — expanded form: 6; final value: 6
- 4^3 — expanded form: $4 \times 4 \times 4$; final value: 64
- 8^2 — expanded form: 8×8 ; final value: 64
- 2^5 — expanded form: $2 \times 2 \times 2 \times 2 \times 2$; final value: 32
- 5^4 — expanded form: $5 \times 5 \times 5 \times 5$; final value: 625
- 10^6 — expanded form: $10 \times 10 \times 10 \times 10 \times 10 \times 10$; final value: 1,000,000

Activity 2: Writing and Evaluating Exponential Expressions

Your child will practice writing and evaluating expressions with exponential notation.

Answer Key:

1. 4 to the power of 5 = 4^5
2. a base of 5 used as a factor 8 times = 5^8
3. $3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6$
4. 12 multiplied by itself 3 times = 12^3
5. 25 squared = 25^2
6. $2^8 = 256$ ($2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$)
7. four cubed = 64 ($4 \times 4 \times 4$)
8. $95^0 = 1$ Any base raised to the power of 0 equals 1.
9. $5^2 + 6^1 = 31$ ($25 + 6 = 31$)
10. $8^2 - 3^3 = 37$ ($64 - 27$)

Day 2**Activity 3: Order of Operations**

Your child will review the order of operations used to solve multi-operation math problems and learn a few new facts to extend her understanding. She will first watch a learning video and then complete an informational notes page. Check that the information she learned from the video is reviewed correctly on the notes page and that the expressions are calculated accurately.

Note that students who enjoy kinesthetic (hands-on) learning may benefit from using the number and symbol cards included in the math kit. Your child can set up the example problems using the cards and move and/or replace numbers and symbols as needed to solve the problems using the order of operations.

- Order of Operations

First: Parentheses and Brackets

Second: Exponents

Third: Multiplication and Division

Fourth: Addition and Subtraction

- Parentheses () and brackets [] show which operations and calculations to do first. If a problem has more than one set of grouping symbols, do all the calculations inside the parentheses or brackets before the non-grouped operations.
- Exponents are a way to show repeated multiplication. They are solved after parentheses and brackets, but before the other operations.
- Multiplication and division are done before addition and subtraction.
- Multiplication and division are equal in the order of operations, so they are calculated in the same step from left to right.
- Addition and subtraction are equal in the order of operations, so they are calculated in the same step from left to right.
- $6 \times (5 - 2) = 18$
- $7^2 \times (3 - 2) = 49$
- $24 + 3 \times 3 = 33$
- $40 \div 5 \times 4 = 32$
- $7 + 5 - 3 + 11 = 20$

Activity 4: Using PEMDAS to Evaluate Expressions

Your child will focus on some important details in the order of operations before solving a variety of problems using the PEMDAS rules. Encourage her to think carefully about each problem, taking time to focus on each step of the order of operations process. If your child struggles to see the series of steps to take, share the answer key with her so that she can better understand the order of calculations for each problem. The number and symbol cards included in the math kit are also helpful tools for solving these types of problems. By physically manipulating the placement of numbers and symbols, many students will better understand how the steps of PEMDAS work.

"PEMDAS: Order of Operations" Answer Key:

1. $18 - 36 \div 9 \times 4 + 8 =$ division $18 - 4 \times 4 + 8 =$ multiplication $18 - 16 + 8 =$ subtraction $2 + 8 =$ addition 10	2. $5 \times [(4 + 2) + 6] - 21 \div 7 \times 3 =$ parentheses $5 \times [6 + 6] - 21 \div 7 \times 3 =$ parentheses $5 \times 12 - 21 \div 7 \times 3 =$ multiplication $60 - 21 \div 7 \times 3 =$ division $60 - 3 \times 3 =$ multiplication $60 - 9 =$ subtraction 51
3. $3 \times (4^2 + 5^2) =$ exponents inside parentheses $3 \times (16 + 25) =$ parentheses $3 \times 41 =$ multiplication 123	4. $(5 + 7)^2 + 9 \times 3 =$ parentheses $(12)^2 + 9 \times 3 =$ exponents $144 + 9 \times 3 =$ multiplication $144 + 27 =$ addition 171

5. $(17^1 + 72) - 4 \times [8 + (3^2 - 5)] =$

exponents inside parentheses

exponents inside parentheses

 $(17 + 72) - 4 \times [8 + (9 - 5)] =$

inner parentheses

 $(17 + 72) - 4 \times [8 + 4] =$

parentheses

parentheses

 $89 - 4 \times 12 =$

multiplication

 $89 - 48 =$

subtraction

41

6. $7 \times (3 + 2) - (4 + 3) = (28 \text{ pencils})$

7. $4^2 - 5 = (11 \text{ years old})$
8. Fill in the missing numbers 2, 4, and 5 to make the number sentence true. $8 + \underline{2} \times (3 + 4) - \underline{4} \div 2 + \underline{5} = 25$
9. Fill in the missing numbers 2, 3, and 5 to make the number sentence true. $\underline{5} + 4 + \underline{3}^2 - 5 \times \underline{2} = 8$
10. Fill in the missing numbers 3, 8, and 9 to make the number sentence true. $\underline{8}^1 + 3(24 - 2^3 \times \underline{3}) - 7 + \underline{9} = 10$; 9, 3, 8 also works - $\underline{9}^1 + 3(24 - 2^3 \times \underline{3}) - 7 + \underline{8} = 10$.

Day 3

Activity 5: Order of Operations Foldable

Your child will create a foldable to go on the same page as the Exponents booklet created in Activity 1. Check that the steps for the example problem are correctly written in the foldable. She will store this page in her Interactive Notebook.

- Parentheses: $7 + 5 \times 2^3 \div 5$
- Exponents: $7 + 5 \times 8 \div 5$
- Multiplication and Division: $7 + 40 \div 5$, then $7 + 8$
- Addition and Subtraction: 15

Activity 6: Quiz

Once your child completes the "Unit 1 Quiz," check her answers, and allow her to correct any mistakes that she makes.

Answer Key:

1. $762.4 + 29.63 = (792.03)$
2. $189.2 - 98.46 = (90.74)$
3. Bob has 2 pumpkins to enter at the state fair. One pumpkin weighs 17.8 pounds and the other pumpkin weighs 23.15 pounds. What is the total weight of Bob's pumpkins? (40.95 pounds)
 $17.8 + 23.15 = 40.95$
4. Gertie ran her last sprint in 26.2 seconds. If she wants to decrease her time by 4.05 seconds, how fast will she need to run the next sprint? (22.15 seconds) $26.2 - 4.05 = 22.15$
5. Match the property to the correct example.
commutative property : $25 \times 12 = 12 \times 25$
associative property : $(6 \times 4) \times 5 = 6 \times (4 \times 5)$
distributive property : $5(3 + 10) = (5 \times 3) + (5 \times 10)$
6. $7.3 \times 0.15 = (1.095)$
7. 45,264 is divisible by: 2, 3, 4, 6, and 12
8. Dwayne was paid \$78 for washing 5 cars. If he was paid an equal amount for each car, how much money does Dwayne earn per car wash? (\$15.60) $\$78 \div 5 = \$15.60$
9. a. Write "seven cubed" in exponential notation and then evaluate the expression. (7^3 ; $7 \times 7 \times 7 = 343$)
b. Write "two to the fourth power" in exponential notation and then evaluate the expression. (2^4 ; $2 \times 2 \times 2 \times 2 = 16$)
10. $30 - 2^3 \times 3 + [16 \div (3 + 1)] = (10)$ Use the order of operations to solve. $30 - 8 \times 3 + [16 \div 4] = 30 - 24 + 4 = 10$

Wrapping Up**Questions to Discuss**

- José says that 2^4 is equal to 16, but Patrick says it's equal to 8. Who is correct and why? (José is correct; 2^4 means to multiply 2 times itself 4 times, not multiply 2 times 4.)
- What is the value of $2^2 + 4^2$? (20) $2^2 = 4$ and $4^2 = 16$; $4 + 16 = 20$
- What are the steps in the order of operations (PEMDAS)? (Parentheses/Grouping symbols, exponents, multiplication and division, addition and subtraction)

Things to Review

- Review that an exponent indicates repeated multiplication
- Review how to write and evaluate exponential expressions
- Review the steps in the order of operations (PEMDAS)