H1N1 Flu Lesson Plans

Dynamics of Algebra 1 RC **Margaret Cerny**

WEEK 2 DAY 3

Objective: Multiplying with Exponents

Directions:

1) Read section 10.3 Rules for Multiplication, from the green Globe text. Be careful to study all of the examples shown.

2) Complete 10.3 “Rules for Multiplication” on page 245 and complete problems #1-18. Be sure to show your work.

3) When you are finished with 10.3 complete 2.1 Powers of Ten Enrichment, #1-18.

Homework: Finish all work.

10.3 Rules for Multiplication

You have multiplied powers with the same base by rewriting as a product of factors.

$$a^3 \cdot a^2 = aaa \cdot aa = aaaaa = a^5$$

You can also multiply by adding the exponents.

$$a^3 \cdot a^2 = a^{3+2} = a^5$$

To multiply powers with the same base, add the exponents and keep the base.

EXAMPLE 1 Multiply. $x^5 \cdot x^7$

	$x^5 \cdot x^7$
Add the exponents of *x*.	$5+7=12$
Write the base with the sum of the exponents.	x^{12}

$x^5 \cdot x^7 = x^{12}$

EXAMPLE 2 Multiply. $4b^2c^4 \cdot 3bc^2$

	$4b^2c^4 \cdot 3bc^2$
Multiply the coefficients.	$12b^2c^4 \cdot bc^2$
b is the same as b^1. **Add the exponents of *b*.**	$2+1=3$
Add the exponents of *c*.	$4+2=6$
Write the bases with the sums of the exponents.	$12b^3c^6$

$4b^2c^4 \cdot 3bc^2 = 12b^3c^6$

Sometimes, the base of a power is another power. Rewrite the product as factors. Then, add the exponents.

EXAMPLE 3 Multiply. $(a^3)^2$

	$(a^3)^2$
Use a^3 as a factor 2 times.	$a^3 \cdot a^3$
Add the exponents.	$3+3=6$
Write the base with the sum of the exponents.	a^6

$(a^3)^2 = a^6$

NAME _____ CLASS _____ DATE _____

ENRICHMENT

2.1 POWERS OF TEN

You can use mental math to square numbers ending in 5 or 0.

To square a two-digit number ending in 5, such as 65, follow the steps below.

STEPS	EXAMPLE
1. Multiply the tens digit times itself plus 1.	$6 \times (6 + 1) = 6 \times 7 = 42$
2. Write the square of 5, or 25, to the right of that product.	4225

So, $65^2 = 4225$.

To square any number ending in 0, such as 40, follow the steps below.

STEPS	EXAMPLE
1. Square the tens digit.	$4^2 = 16$
2. Multiply the product by 10^2, or 100.	$16 \times 10^2 = 16 \times 100 = 1600$

So, $40^2 = 1600$.

Exercises

Write each expression as an integer. Use mental math.

1. 15^2 _____	**2.** 95^2 _____	**3.** 25^2 _____	**4.** 90^2 _____
5. 50^3 _____	**6.** 45^2 _____	**7.** 20^2 _____	**8.** 35^2 _____
9. 80^2 _____	**10.** 85^2 _____	**11.** 60^2 _____	**12.** 75^2 _____
13. 15^2 _____	**14.** 70^2 _____	**15.** 30^2 _____	**16.** 55^2 _____

17. Explain how to use mental math to square a number ending in 2 zeros, such as 300.

_____

18. Explain how to use mental math to square a number ending in 3 zeros, such as 6,000.

_____

Name: _____ Date: _____

10.3 Rules for Multiplication

TRY THESE

Multiply.

1. $2x^2y \cdot 5xy$

	$2x^2y \cdot 5xy$
Multiply the coefficients.	$\blacksquare x^2y \cdot xy$
Add the exponents of x.	$2+1=\blacksquare$
Add the exponents of y.	$1+\blacksquare=\blacksquare$
Write the bases with the sums of the exponents.	$10x^{\blacksquare}y^{\blacksquare}$

2. $(c^4)^3$

	$(c^4)^3$
c^4 is used as a factor ■ times.	$c^4 \cdot c^4 \cdot c^4$
Add the exponents.	$\blacksquare+\blacksquare+\blacksquare=12$
Write the base with the sum of the exponents.	$(c^4)^3=c^{\blacksquare}$

Practice

Multiply.

1. $x^4 \cdot x^6$
2. $a^2b \cdot a^3$
3. $w^2x^3 \cdot w^3x^3$
4. $x^7 \cdot x^3$
5. $b^6c^6 \cdot b^2c^6$
6. $5w^4x^5 \cdot x^2$
7. $a^2 \cdot 3a^2$
8. $2b^3 \cdot 4wb^4$
9. $5c^5q^3 \cdot 6cq$

10. $-6a^4b \cdot 2a^5b^6$

11. $(a^3)^3$

12. $(4c^2)^3$

13. $(d^5)^2$

14. $(x^6)^2$

15. $(y^4)^5$

16. $x^4y^5 \cdot -4$

17. $-8n^5 \cdot 4n^2p$

18. $-6x^5y \cdot 6xy^5$

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WEEK 2 DAY 4

Objective: Dividing with Exponents

Directions:

1) Read section 10.4 Division with Exponents, from the green Globe text. Be careful to study all of the examples shown.

2) Complete Notes pages on Division with Exponents for Binder.

3) Complete 10.4 “Division with Exponents” Practice and complete problems #1-18. Be sure to show your work.

4) Next, complete “How Did Slugger McFist Get a BLACK EYE?” and complete problems #1-23.

Homework: Finish all work.

DAY 4

Notes for Chapter 10 Exponents and Functions

Division of Powers with the same base

1. To divide powers with the **same base**, keep the base and _____ the exponent in the denominator from the exponent in the numerator.

Example 1 Divide. $x^7 \div x^2$

$$\frac{x^7}{x^2} = x^{7-2} = x^5$$

Example 2 Divide. $b^4 c^3 \div b^2 c^2$

Rewrite & then subtract the exponents.

$$\frac{b^4 c^3}{b^2 c^2} = b^{4-2} c^{3-2}$$

$$= b^2 c^1$$

Example 3 Divide. $\frac{12\,c^{5}}{3\,c^{2}} =$

10.4 Division with Exponents

To divide two powers with the same base, write the division as a fraction. Then, remove common factors.

A number divided by itself equals 1.

$$a^4 \div a^2 = \frac{\overset{1}{\cancel{a}}\overset{1}{\cancel{a}}aa}{\underset{1}{\cancel{a}}\underset{1}{\cancel{a}}} = \frac{1aa}{1} = a^2$$

EXAMPLE 1 Divide. $a^5 \div a^2$

Write as a fraction. $\frac{a^5}{a^2}$

Rewrite as factors. Remove common factors. $\frac{aaaaa}{aa} = \frac{\overset{1}{\cancel{a}}\overset{1}{\cancel{a}}aaa}{\underset{1}{\cancel{a}}\underset{1}{\cancel{a}}}$

Simplify. aaa

Rewrite with an exponent. a^3

$a^5 \div a^2 = a^3$

EXAMPLE 2 Divide. $b^4c^3 \div b^2c^2$

Write as a fraction. $\frac{b^4c^3}{b^2c^2}$

Rewrite as factors. Remove common factors. $\frac{bbbbccc}{bbcc} = \frac{\overset{1}{\cancel{b}}\overset{1}{\cancel{b}}\overset{1}{\cancel{b}}\overset{1}{\cancel{b}}\overset{1}{\cancel{c}}\overset{1}{\cancel{c}}c}{\underset{1}{\cancel{b}}\underset{1}{\cancel{b}}\underset{1}{\cancel{c}}\underset{1}{\cancel{c}}}$

Simplify. bbc

Rewrite with an exponent. b^2c

$b^4c^3 \div b^2c^2 = b^2c$

Be sure to divide the coefficients.

EXAMPLE 3 Divide. $10x^2y \div 5x$

Write as a fraction. $\frac{10x^2y}{5x}$

$10 \div 5 = 2$

Divide the coefficients. $\frac{2x^2y}{x}$

Rewrite as factors. Remove common factors. $\frac{2xxy}{x} = \frac{2\overset{1}{\cancel{x}}xy}{\underset{1}{\cancel{x}}}$

Simplify. $2xy$

$10x^2y \div 5x = 2xy$

How Did Slugger McFist Get A BLACK EYE?

TO ANSWER THIS QUESTION: Express any quotient below as a decimal numeral and find this numeral in the code key. Notice the letter next to it. Print this letter in the box at the bottom of the page that contains the exercise number. Keep working and you will discover the answer to the title question.

① $10^5 \div 10^2 =$

② $10^2 \div 10^5 =$

③ $10^{-6} \div 10^2 =$

④ $10^{-1} \div 10^{-3} =$

⑤ $10^2 \div 10^{-7} =$

⑥ $10^6 \div 10 =$

⑦ $10^{-3} \div 10^{-3} =$

⑧ $\frac{10}{10^4} =$

⑨ $\frac{10^{-5}}{10^5} =$

⑩ $\frac{10^{10}}{10^{20}} =$

⑪ $\frac{10}{10^{-1}} =$

⑫ $\frac{10^{-2}}{10} =$

⑬ $\frac{10^{-8}}{10^{-9}} =$

⑭ $\frac{10^4}{10^{-3}} =$

⑮ $\frac{10^{-5}}{10^3} =$

⑯ $\frac{10^4}{10^6} =$

⑰ $\frac{10^{-2}}{10^{-1}} =$

⑱ $\frac{10}{10^{-2}} =$

⑲ $\frac{10^3}{10^3} =$

⑳ $10^{15} \div 10^{14} =$

㉑ $10^{-5} \div 10 =$

㉒ $10^{-7} \div 10^{-3} =$

㉓ $10 \div 10^6 =$

CODE KEY	
0.0000000001	U
0.00000001	I
0.000001	C
0.00001	M
0.0001	G
0.001	E
0.01	W
0.1	T
1	D
10	H
100	A
1000	S
100,000	L
10,000,000	B
1,000,000,000	Y

13	12	16	4	1	20	3	17	14	5	11	22	9	15	19	8	7	23	10	18	21	6	2

Name: _____ Date: _____

10.4 Division with Exponents

TRY THESE

Divide.

1. $12w^3 \div 6w^2$

Write as a fraction. $\frac{12w^3}{6w^2}$

Divide the coefficients. $\frac{\blacksquare w^3}{w^2}$

Rewrite as factors. Remove common factors. $\frac{\blacksquare www}{ww}$

Simplify. $\blacksquare$

$12w^3 \div 6w^2 = \blacksquare$

2. $a^2b^4 \div ab^2$

Write as a fraction. $\frac{a^2b^4}{ab^2}$

Rewrite as factors. Remove common factors. $\frac{aabbbb}{abb}$

Simplify. $\blacksquare$

Rewrite with exponents. $ab\blacksquare$

$a^2b^4 \div ab^2 = \blacksquare$

Practice

Divide.

1. $b^4 \div b^3$

2. $x^2y \div x$

3. $5c^2d^3 \div cd^2$

4. $15w^4 \div 3w$

5. $s^2t^8 \div st^3$

6. $14x^3y^4 \div 7x^2$

7. $6n^2p \div np$

8. $12x^4y^5 \div -4x^3y^4$

9. $9x^2y \div y$

10. $8m^4n^2 \div 2mn^2$

11. $pq^4 \div pq^2$

12. $x^3y^4 \div x^$

13. $r^4k^3 \div r^3k^3$

14. $24xy^5 \div 4xy$

15. $ab^2c \div b$

16. $-21x^4v^2 \div 3x^2$

17. $18x^6v^3 \div 3x^2y$

18. $4a^3b \div 4b$

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WEEK 2 DAY 5

Objective: Scientific Notatiion
Directions:

1) Read section 10.8 Scientific Notation from the green Globe text. Be careful to study all of the examples shown.

2) Complete Practice on page 255, #1-14.

3) Complete Reteaching 2.4 Scientific Notation, #1-8.

4) Next, complete Extra Practice 2.4 Scientific Notation #1-25.

5) Then work on 2.5 Using Scientific Notation, #1-28.

Homework: Finish all work.

10.8 Scientific Notation

Scientific notation is used to name large numbers such as 324,000. A number in scientific notation has two factors.

3.24	$\times$	10^5
first factor		second factor
a number between 1 and 10		a power of 10

You can find the large number by multiplying.

$3.24 \times 10^5 = 3.24 \times 100{,}000 = 324000. = 324{,}000$

Move the decimal point one place for each zero in the power of ten. This is the same as the exponent in the second factor. Move to the right when the exponent is positive.

EXAMPLE 1 Find the number named by 9.2×10^3.

3 is the exponent in 10^3.

10^3 is equal to 1,000. $9.2 \times 1{,}000$

Move the decimal point 3 places to the right. $9200. = 9{,}200$

$9.2 \times 10^3 = 9{,}200$

EXAMPLE 2 Find the number named by 4.32×10^5.

10^5 is equal to 100,000. $4.32 \times 100{,}000$

Move the decimal point 5 places to the right. $432000. = 432{,}000$

$4.32 \times 10^5 = 432{,}000$

You can use a negative exponent to name a very small number. Move the decimal point one place to the left for each decimal place in the power of 10.

EXAMPLE 3 Find the number named by 3.8×10^{-4}.

10^{-4} is equal to .0001 $3.8 \times .0001$

Move the decimal point 4 places to the left. $.00038 = .00038$

$3.8 \times 10^{-4} = .00038$

TRY THESE

Find each number named in scientific notation.

1. 9.08×10^{-5}

10^{-5} is equal to ■.
Move the decimal point ■ places to the ■.
$9.08\times10^{-5}=$ ■

9.08×10^{-5}
$9.08\times.00001$
$.0000908$

2. 1.3×10^{3}

10^{3} is equal to ■.
Move the decimal point ■ places to the right.
$1.3\times10^{3}=$ ■

1.3×10^{3}
$1.3\times$ ■
$1300.$

Practice

Find each number named in scientific notation.

1. 1.61×10^{2} **2.** 8.4×10^{3} **3.** 9.24×10^{5}

4. 5.29×10^{4} **5.** 2.742×10^{5} **6.** 3.9×10^{2}

7. 2.6×10^{-2} **8.** 1.04×10^{-3} **9.** 4.1×10^{-5}

10. 6.08×10^{4} **11.** 4.7×10^{-6} **12.** 1.9×10^{5}

Find the number written in scientific notation in each sentence.

13. The distance from the earth to the sun is about 9.3×10^{7} miles.

14. One atom of oxygen has a mass of 2.66×10^{-23} grams.

Do It Together!

15. Write a number in scientific notation. Ask a partner to find the number you named.

16. Pick a decimal number between 1 and 10. Ask a partner to find the product of your number and 10^{4}.

10.8 Scientific Notation

Scientific notation is used to name large numbers such as 324,000. A number in scientific notation has two factors.

3.24	×	10^5
first factor		second factor
a number between 1 and 10		a power of 10

You can find the large number by multiplying.

$3.24 \times 10^5 = 3.24 \times 100{,}000 = 324000. = 324{,}000$

Move the decimal point one place for each zero in the power of ten. This is the same as the exponent in the second factor. Move to the right when the exponent is positive.

EXAMPLE 1 Find the number named by 9.2×10^3.

3 is the exponent in 10^3.

10^3 is equal to 1,000. $9.2 \times 1{,}000$

Move the decimal point 3 places to the right. $9200. = 9{,}200$

$9.2 \times 10^3 = 9{,}200$

EXAMPLE 2 Find the number named by 4.32×10^5.

10^5 is equal to 100,000. $4.32 \times 100{,}000$

Move the decimal point 5 places to the right. $432000. = 432{,}000$

$4.32 \times 10^5 = 432{,}000$

You can use a negative exponent to name a very small number. Move the decimal point one place to the left for each decimal place in the power of 10.

EXAMPLE 3 Find the number named by 3.8×10^{-4}.

10^{-4} is equal to .0001 $3.8 \times .0001$

Move the decimal point 4 places to the left. $.00038 = .00038$

$3.8 \times 10^{-4} = .00038$

NAME _____ CLASS _____ DATE _____

RETEACHING

2.4 SCIENTIFIC NOTATION

To convert from decimal notation to scientific notation, first place a pointer to the right of the first nonzero digit. Then count the spaces as you move from the decimal point to the pointer. If you move to the right, use a positive exponent for 10. If you move to the left, use a negative exponent for 10.

EXAMPLE 1

Write 89,100,000 in scientific notation.

SOLUTION

89,100,000 — Place the pointer to the right of the first nonzero digit, in this case, 8.

89,100,000 (7 spaces) — Next, count the spaces as you move from the decimal point (which is to the right of the last zero).

8.91×10^7 — Then move the decimal point to the pointer and multiply the number by 10 with an exponent equal to the number of places you moved—in this case, 7.

EXAMPLE 2

Write 0.000675 in scientific notation.

SOLUTION

0.000675 — Place the pointer to the right of the first nonzero digit, in this case, 6.

0.000675 (4 spaces) — Next, count the spaces as you move from the decimal point.

6.75×10^{-4} — Then move the decimal point to the pointer and multiply the number by $\frac{1}{10}$ with an exponent equal to the number of places you moved—in this case, 4. Write $\left(\frac{1}{10}\right)^4$ as 10^{-4}.

Exercises

Write each number in scientific notation. Show your work.

1. 691

2. 34,500

3. 1,190,000

4. 0.00098

5. 782,500

6. 0.000000006

7. 68,000,000,000

8. 0.0000785

NAME _____ CLASS _____ DATE _____

EXTRA PRACTICE 2.4 SCIENTIFIC NOTATION

Write each amount in scientific notation.

1. 910.5

2. 0.00076

3. 320,000

4. 0.00000432

5. 75,488

6. 0.00007

7. 98,000,000

8. 0.000607

9. 435.886

10. Radio waves travel at 300,000,000 meters per second. _____

11. The population of India in 2025 is expected to exceed 1,400,000,000.

_____

Write each amount in decimal notation.

12. 1.23×10^7

13. 6.09×10^4

14. 4.81×10^5

15. 2.2×10^8

16. 9.1×10^5

17. 8.04×10^2

18. 2.3×10^{-2}

19. 3.4×10^{-4}

20. 5.7×10^{-5}

21. 7.7×10^{-3}

22. 6.57×10^{-6}

23. 9.80×10^{-2}

24. The movement of a glacier is approximately 5×10^{-4} kilometers per hour.

_____

25. A micron is a unit of measure 1×10^{-3} millimeters in length. _____

NAME _____ CLASS _____ DATE _____

RETEACHING

2.5 USING SCIENTIFIC NOTATION

To multiply powers of ten, add the exponents. To divide powers of ten, subtract the exponents.

EXAMPLE 1

Simplify $10^6 \times 10^{-2}$. Write the answer as a power of 10.

SOLUTION

To simplify $10^6 \times 10^{-2}$, add the exponents.

$$10^6 \times 10^{-2} = 10^{6 + (-2)}$$
$$= 10^4$$

EXAMPLE 2

Simplify $10^6 \div 10^{-2}$. Write the answer as a power of 10.

SOLUTION

To simplify $10^6 \div 10^{-2}$, subtract the exponents.

$$10^6 \div 10^{-2} = 10^{6 - (-2)}$$
$$= 10^8$$

Exercises

Simplify. Write each answer as a power of ten.

1. $10^4 \times 10^2$ _____

2. $10^4 \div 10^2$ _____

3. $10^5 \times 10^3$ _____

4. $10^5 \div 10^3$ _____

5. $10^9 \times 10^6$ _____

6. $10^9 \div 10^6$ _____

7. $10^{12} \times 10^4$ _____

8. $10^{12} \div 10^4$ _____

9. $10^7 \times 10^{-4}$ _____

10. $10^7 \div 10^{-4}$ _____

11. $10^4 \times 10^{-2}$ _____

12. $10^4 \div 10^{-2}$ _____

13. $10^{10} \times 10^{-5}$ _____

14. $10^{10} \div 10^{-5}$ _____

15. $10^{11} \times 10^{-7}$ _____

16. $10^{11} \div 10^{-7}$ _____

17. $10^{-6} \times 10^2$ _____

18. $10^{-6} \div 10^2$ _____

19. $10^{-8} \times 10^3$ _____

20. $10^{-8} \div 10^3$ _____

21. $10^{-9} \times 10^{-2}$ _____

22. $10^{-9} \div 10^{-2}$ _____

23. $10^{-5} \times 10^{-4}$ _____

24. $10^{-5} \div 10^{-4}$ _____

25. $10^9 \times 10^{-10}$ _____

26. $10^9 \div 10^{-10}$ _____

27. $10^{-12} \times 10^{12}$ _____

28. $10^{-12} \div 10^{12}$ _____