

Name: _____

Date: _____

Ms. Napolitano

Day 3 Review Order of Operations

Directions: I will model below. Please review the model before you complete the independent practice.

"I Can Simplify Numerical Expressions with Exponents."

Introducing Exponents

Before we start evaluating expressions, we need to talk about exponents.

base $\rightarrow 4^3 = 4 \cdot 4 \cdot 4 = 64$

Exponent

Express the following using Exponents (Exponent Form).

1. $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
 7^6

2. $3 \cdot 3 \cdot 3 \cdot 3$
 3^4

3. 5
 5^1

4. $a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a$
 a^8

5. $3 \cdot 3 \cdot 3 + 4 \cdot 4$
 $3^3 + 4^2$

6. $2 \cdot 2 \cdot 8 \cdot 8 \cdot 8 \cdot 8$
 $2^2 \cdot 8^4$

Express the following as a product of factors (Expanded Form).

1. 15^4

$$15 \times 15 \times 15 \times 15$$

2. 4^2

$$4 \times 4$$

3. c^9

$$c \times c \times c \times c \times c \times c \times c \times c \times c$$

4. $6^3 + 2^2 \cdot 5^2$

$$6 \times 6 \times 6 + 2 \cdot 2 \cdot 5 \cdot 5$$

Express the following in Expanded Form and then in Standard Form

1. 5^3

$$5 \times 5 \times 5$$

$$= 125$$

2. 2^5

$$2 \times 2 \times 2 \times 2 \times 2$$

$$= 32$$

solution

standard form - the value or solution.

Now it's your turn....

Express the following using exponents (Exponential Form)

1) $5 \times 5 \times 5 =$ _____

2) $6 \times 6 =$ _____

3) $8 \times 8 \times 8 =$ _____

4) $7 \times 7 \times 9 \times 9 \times 9 \times 9 \times 9 =$ _____

5) $B \times B \times B \times B \times B + 3 \times 3 \times 6 \times 6 \times 6 \times 6 =$ _____

Express the following as a product of factors (Expanded Form)

1) $9^5 =$ _____

2) $16^3 =$ _____

3) $6^3 + 13^4 =$ _____

Express the following in expanded form and then in standard form

1) $3^5 =$ _____ $=$ _____

2) $5^2 + 3^3 =$ _____ $=$ _____

3) $9^2 - 4^3 =$ _____ $=$ _____

Model

Let's tie this into our Order of Operations.

P

E

M \leftrightarrow D

A \leftrightarrow S

<p>1. $3 \cdot 6^2 + 4$</p> <p>$3 \cdot 36 + 4$</p> <p>$108 + 4$</p> <p>112</p> <p>P E M or D A or S</p>	<p>2. $24 \div 2^3 + 6$</p> <p>$24 \div 8 + 6$</p> <p>$3 + 6$</p> <p>9</p> <p>P E M or S A or S</p>
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Now it's your turn....

<p>3. $5^2 + 8 \div 2$</p>	<p>4. $25 - 8 \cdot 2 + 3^3$</p>
<p>5. $6 \cdot (13 - 7) \div (8 - 5)^2$</p>	<p>6. $12 \div 4 + (4^3 - 6)$</p>

Practice Make Perfect!

1. $12 - 8 \div 2 + 3 \cdot 4$

2. $3 \cdot (5 + 17 - 14) \div 4 + 15$

Fill in the Table:

	Exponent Form	Expanded Form	Standard Form
3.	4^3		
4.		$2 \cdot 2 \cdot 2 \cdot 2$	
5.	3^2		
6.		$8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$	16,777,216
7.	$3^2 + 5^2$		
8.		$9 \cdot 9 + 2 \cdot 2 \cdot 2$	89
9.	$2^3 \cdot 3^2$		

10. $3^3 + 21 \div 7$

11. $4 \bullet 3^2 - 4^3 \div 8$

12. Which of the following statements are true about the following expressions?

$$6^2 - (6 \times 2)$$

$$(4^2 - 2) \times 2$$

- I. The two expressions are equivalent
- II. The first expression is eight times as large as the second expression.
- III. Both expressions are numerical expressions.

13. A teacher asks his students to give meaning to $(2t)^3$. One of the students incorrectly says $(2t)^3$ means $2 \cdot t \cdot t \cdot t$.

Express the repeated multiplication for $(2t)^3$ using multiplication signs.

What is the student's error?

Keep it up.... Practice is the key to SUCCESS!

Selected Response

- Which expression is equivalent to $2.3 \times 2.3 \times 2.3 \times 2.3 \times 2.3$?
(A) 2.3×5
(B) 23^5
(C) $2^5 \times 3^5$
(D) 2.3^5
- Which operation should you perform first when you simplify $63 - (2 + 54 \times 6) \div 5$?
(A) addition
(B) division
(C) multiplication
(D) subtraction
- Sheena was organizing items in a scrapbook. She took 25 photos and divided them evenly between p pages. Which algebraic expression represents the number of photos on each page?
(A) $p - 25$
(B) $25 - p$
(C) $\frac{p}{25}$
(D) $\frac{25}{p}$
- Which is another way to write $7 \times 7 \times 7 \times 7$?
(A) 7^4
(B) $7(4)$
(C) 28
(D) 4^7
- Angela earns x dollars an hour. On Friday, she worked 6 hours. On Saturday, she worked 8 hours. Which expression shows how much she earned both days?
(A) $6x + 8$
(B) $8x \times 6x$
(C) $(6 + 8)x$
(D) $\frac{6 + 8}{x}$
- Marcus is doing a science experiment in which he measures the rate at which bacteria multiply. Every 15 seconds, the bacteria double in number. If there are 10 bacteria now, how many will there be in 2 minutes?
(A) 160 bacteria
(B) 256 bacteria
(C) 1,280 bacteria
(D) 2,560 bacteria
- The prime factorization of which number is $2^5 \times 5$?
(A) 50
(B) 125
(C) 160
(D) 500
- Which expression has a value of 36 when $x = 4$ and $y = 7$?
(A) $2xy$
(B) $2x + 4y$
(C) $6y - x$
(D) $12x - 2y$



When possible, use logic to eliminate at least two answer choices.

9. What should you do first to simplify the expression $(4^3 + 9) \div 76 + 5$?
- (A) Add 4 and 9.
(B) Add 76 and 5.
(C) Multiply $4 \times 4 \times 4$.
(D) Divide $(4^3 + 9)$ by 76.
10. Which ratio is equivalent to 4:10?
- (A) $\frac{2}{5}$
(B) $\frac{8}{10}$
(C) $\frac{12}{16}$
(D) $\frac{16}{10}$
11. Travis and Paula went to lunch. Travis ordered a sandwich for \$7.50, and Paula ordered a burger for \$5.25. After lunch, they left a 15% tip for their waiter. How much money did they spend altogether?
- (A) \$12.75
(B) \$14.66
(C) \$15.95
(D) \$16.00
12. Which shows the following numbers in order from greatest to least?
- $1.5, \frac{2}{4}, \frac{4}{2}, 1.05$
- (A) $\frac{4}{2}, 1.5, 1.05, \frac{2}{4}$
(B) $1.05, 1.5, \frac{2}{4}, \frac{4}{2}$
(C) $\frac{4}{2}, \frac{2}{4}, 1.5, 1.05$
(D) $1.05, \frac{4}{2}, \frac{2}{4}, 1.5$

Mini-Tasks

13. For every bag of trail mix the local Scout Guide troop sells, they earn \$0.45.
- a. Write an expression to represent this situation.
- _____
- b. Sarah sold 52 bags of trail mix. How much did she earn for her troop?
- _____
- c. Let x represent the total number of bags of trail mix sold by Sarah's troop. Write an expression to show what percentage of bags Sarah sold.
- _____
14. Robert is replacing sod in two square-shaped areas of his backyard. One side of the first area is 7.5 feet. One side of the other area is 5.7 feet. The sod costs y dollars per square foot.
- a. Write an expression to show how much Robert will spend on sod.
- _____
- b. If the sod costs \$3.25 per square foot, about how much will Robert spend to put sod down in both areas of his backyard? Round to the nearest dollar.
- _____
15. Jose wants to find how many gallons of water he needs to fill his cube-shaped aquarium. One side of his aquarium is 4 feet long.
- a. Write and solve an expression to find the volume of Jose's aquarium.
- _____
- b. One cubic foot is equal to 7.48 gallons of water. How many gallons of water does Jose need to fill his aquarium? Round to the nearest gallon.
- _____