Exponents and Order of Operations

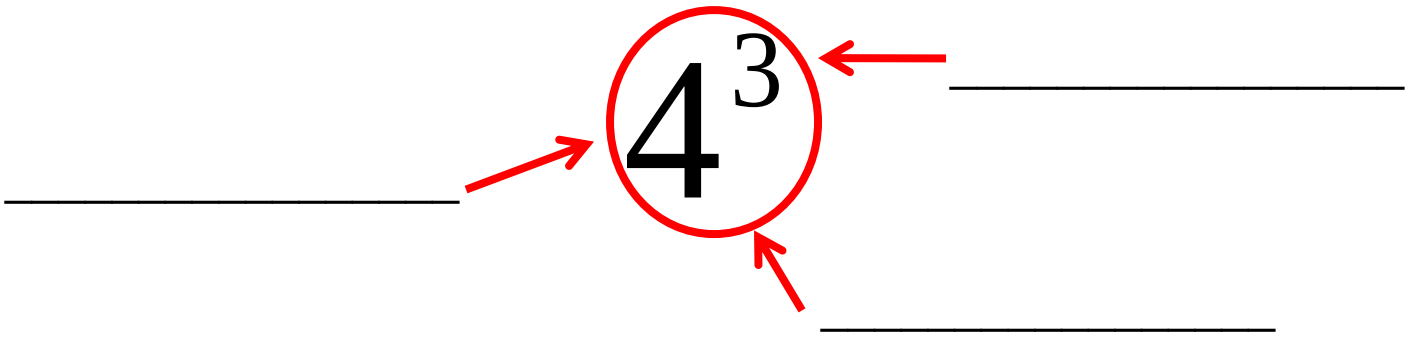
Essential Question

How do you know which operation to choose when solving a real-life problem?

Do Now

Why is $4 \times 4 \times 4$ called a "product of repeated factors?"

Parts of Powers



Special ways to call certain powers

5^2 _____

_____

7^3 _____

_____

Example 1

Write each product as a power.

1) $6 \bullet 6 \bullet 6 \bullet 6 \bullet 6 \bullet 6 \bullet 6$

2) $15 \times 15 \times 15 \times 15$

Example 2

Find the value of each power.

a) 7^2

b) 5^3

Perfect Squares

The value of a square of two whole numbers is known as a perfect square.

In other words, the perfect square is the answer when you multiply two whole numbers

Find the value of each perfect square.

1^2 5^2 9^2

2^2 6^2 10^2

3^2 7^2 11^2

4^2 8^2 12^2

Circle or highlight each of the perfect squares in WHITE.

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

What do you notice? Is there a pattern?

Example 3

Determine whether each number is a perfect square.

5) 64

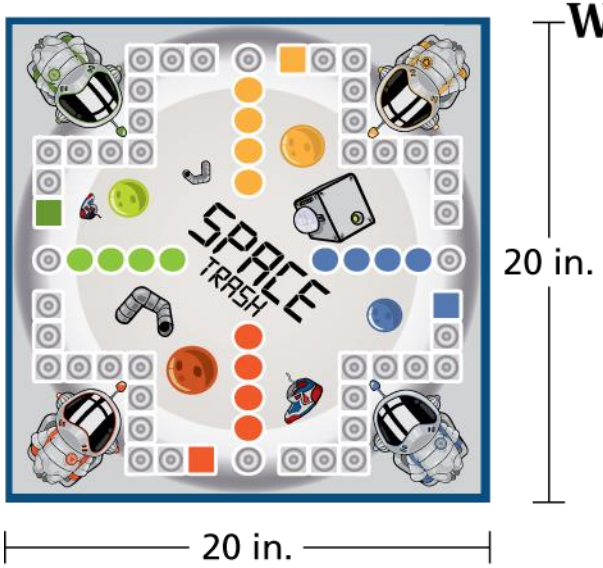
6) 20

7) 50

8) 9

Real-Life Application

A game board is a square with a side length of 20 inches. What is the area of the game board?



Review – Order of Operations

P_____

E_____

M_____

D_____

A_____

S_____

Practice

Evaluate the following

P E M D A S

Left → Right Left → Right

a) $12 - 2 \times 4$

b) $7 + 60 \div (3 \bullet 5)$

Practice

P E M D A S

Left → Right Left → Right

Evaluate the following

c) $30 \div \left(7 + 2^3\right) \times 6$

Practice

Evaluate the following

P E M D A S

Left → Right Left → Right

d) $6 \times 15 - 10 \div 2$

e) $6 + 2^4 - 1$

Practice

Evaluate the following

P E M D A S

Left → Right Left → Right

$f)\quad 9+7(5-2)$

Practice

Evaluate the following

P E M D A S

Left → Right Left → Right

g) $15 - 4(6+1) \div 2^2$

Practice

P E M D A S

Left → Right Left → Right

Evaluate the following

h) $\dfrac{8(3+4)}{7}$

Real-Life Application

You buy foam spheres, paint bottles, and wooden rods to construct a model of our solar system. What is your total cost?

Item	Quantity	Cost per Item
Spheres	9	$2
Paint	6	$3
Rods	8	$1

Key Words

- Product
- Factor
- Exponent
- Base
- Value
- Perfect Square
- Evaluate
- Numerical Expression
- Order of Operations