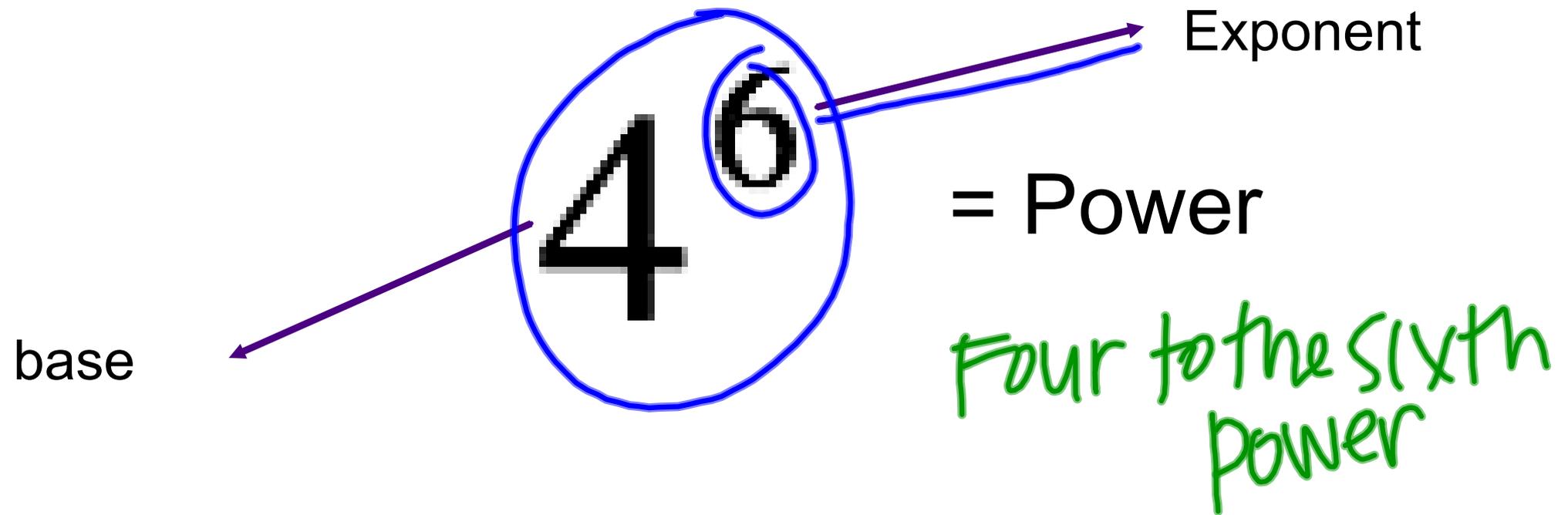


1.2 & 1.3 Exponents and Order of Operations



Exponents mean repeated multiplication

$$4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$$

Exponential Form

Words

Meaning

10^1

Ten to the first power

10

4^2

Four squared

4.4

Four to the second power

5^3

Five to the third power

5.5.5

Five cubed

7^6

Seven to the sixth power

7.7.7.7.7.7

Evaluating Exponents

What does it mean to evaluate? Solve, perform the operation

$$\begin{aligned} 5^3 &= 5 \cdot 5 \cdot 5 \\ &= 25 \cdot 5 \\ &= 125 \end{aligned}$$

$$\begin{aligned} 3^3 &= 3 \cdot 3 \cdot 3 \\ &= 9 \cdot 3 \\ &= 27 \end{aligned}$$

Any # raised
to the zero
power is 1.

$$x^0 = 1$$

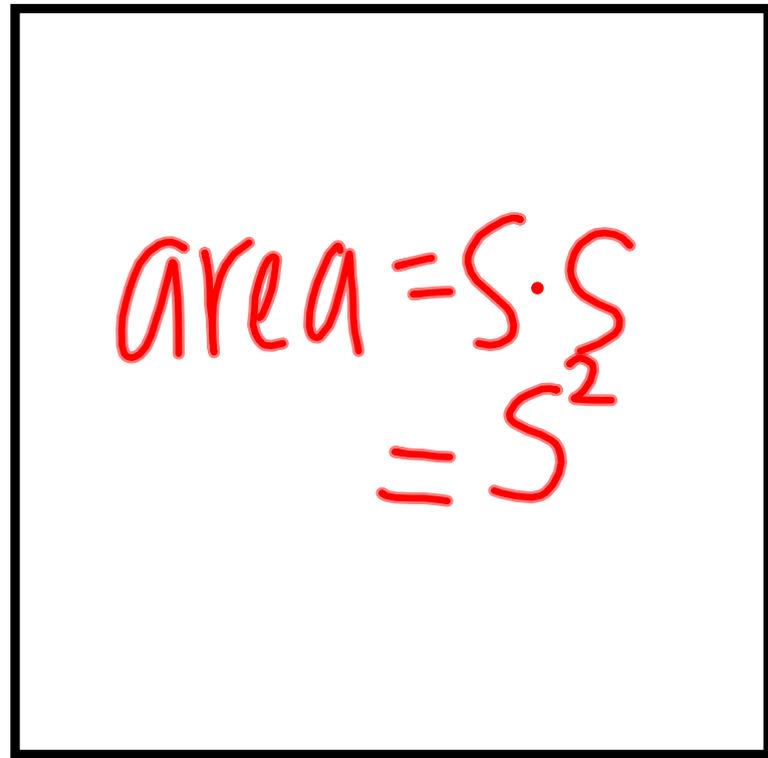
$$\begin{aligned} 2^{-1} &= \frac{1}{2} \div 2 \\ 2^0 &= 1 \div 2 \\ 2^1 &= 2 \div 2 \\ 2^2 &= 4 \div 2 \\ 2^3 &= 8 \div 2 \\ 2^4 &= 16 \div 2 \\ 2^5 &= 32 \div 2 \end{aligned}$$

↑

Grouping Exponents

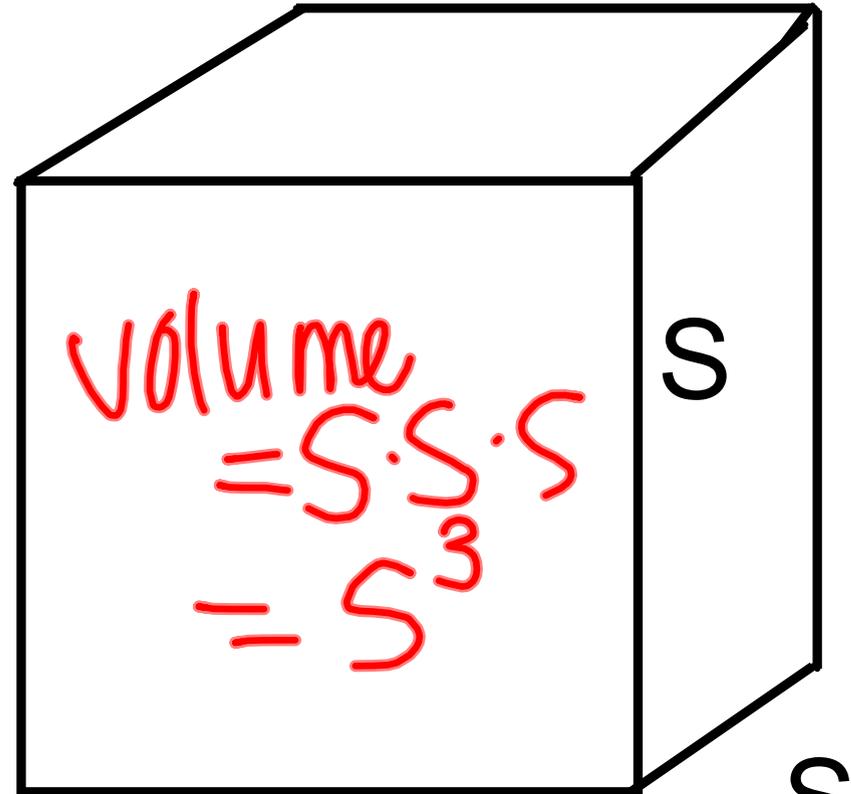
$$\begin{array}{ccc} \textcircled{4^2 + 3^2} & = & \textcircled{(4 + 3)^2} \\ 16 + 9 & & 7^2 \\ 25 & \neq & 49 \end{array}$$

Real World Situations



s

s



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s

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Order of Operations

$$\underline{25 - 4 \cdot 6 = 8}$$

$$\underline{(3 + 2)^2 - 4 \cdot 6 \neq 2^3}$$

$$\begin{array}{l} 25 - 24 = 8 \\ 1 \neq 8 \end{array}$$

1. First do operations under the grouping symbols.

(), { }, []

2. Then evaluate exponents.

3. Then do multiplication and division, left to right.

4. Finally do addition and subtraction left to right.

Fraction bars can act as grouping symbols

Practice

$$6 + 6 \cdot 3 = 6 + 18 = 24$$

$$\underline{6 + 12 \div 2 \cdot 3}$$

$$27 - 12 \div 3 + 3$$

$$16 + 2^3 \div 4 = 16 + 8 \div 4$$
$$= 16 + 2$$
$$= 18$$

$$\underline{(16 + 2^3)} \div 4 = (6 + 8) \div 4$$
$$= 14 \div 4 = 7/2$$

$$16 + (2^3 \div 4)$$

$$(16 + 2)^3 \div 4$$

$$\frac{16 + 2^3}{4}$$

Word Problems

Brenda is buying some items from the store. She has a list, and while she is shopping, she writes the cost of the items on her list.

2.85²

2 gallons of milk - \$2.85 each

1 loaf of bread - \$1.55 each

3 packages of sandwich meat - \$2.25 each

4 tomatoes – 4 for \$1

Which of the following expressions could be used to find the total cost of the items? Circle all that apply.

A. $2.85 + 2.85 + 1.55 + 2.25 + 2.25 + 2.25 + 1.00$

B. $2(2.85)$ + 1.55 + $3(2.25)$ + 1.00

C. $2(2.85 + 1.55) + 3(2.25 + 1.00)$

D. $2 \ 2.85 + 1.55 + 3 \ 2.25 + 1.00$

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C. $2(2.85 + 1.55) + 3(2.25 + 1.00)$

D. $2 \cdot 2.85 + 1.55 + 3 \cdot 2.25 + 1.00$