






Properties

Variable - a letter (a, x, m) that takes the place or represents an unknown #.

| | |
|--|---|
| <p>Commutate</p> <p>Dad commutes \rightarrow and \leftarrow from work by train. </p> | <p>Identity</p> <p>The fingerprints revealed the thief's <u>identity</u>. </p> |
| <p>Commutative Property of Addition</p> <p>$4+5=9$ $5+4=9$</p> | <p>Identity Property of Addition</p> <p>$3+0=3$</p> |
| <p>Commutative Property of Multiplication</p> <p>$4 \times 5 = 20$ $5 \times 4 = 20$</p> | <p>Identity Property of Multiplication</p> <p>$3 \times 1 = 3$</p> |
| <p>Associate</p> <p>When at school, Josh often <u>associates</u> with Tanner. </p> <p>When at home, Josh often <u>associates</u> with Kevin. </p> | <p>Distribute</p> <p>Grandma <u>distributes</u> gifts to each grandchild. </p> |
| <p>Associative Property of Addition</p> <p>$6 \cdot (7 \cdot 3) = 16$ $(6 \cdot 7) \cdot 3 = 16$</p> | <p>Distributive Property</p> <p>$20 + 30$ $5(4+6) = 50$</p> |
| <p>Associative Property of Multiplication</p> <p>$2 \cdot (5 \cdot 4) = 40$ $(2 \cdot 5) \cdot 4 = 40$</p> | |

cd

$cd = dc$ What property is used to give an equivalent expression? Commutative

$x + 13 = 13 + x$ What property is used to give an equivalent expression? Commutative

$4(2x + 3) = (4 \cdot 2x) + (4 \cdot 3)$ What property is used to give an equivalent expression? distributive

$2(a + b) = (2+a) + b$ ass

Use the associative property to write an equivalent expression

Properties

1.) **Associative (Associate):** Regroup the numbers with parenthesis and the sum will be the same.

- a.) same numbers
- b.) same order
- c.) parenthesis are different

Ex. $(2+3)+4 = 2+(3+4)$ or $(2 \times 3) \times 4 = 2 \times (3 \times 4)$

2.) **Commutative (Move/Commute):** Change the order of the numbers and the sum will be the same.

- a.) same numbers
- b.) different order
- c.) no parenthesis

Ex. $2+3 = 3+2$ or $2 \times 3 = 3 \times 2$

Distributive Property

The sum of two addends multiplied by a number is equal to the sum of the products of each addend and the number.

- a.) repeated numbers

Ex. $5(3+4) = 5 \times 3 + 5 \times 4$
 $5 \times 7 = 15 + 20$
 $35 = 35$

Identify

$2+4+6 = 4+6+2$ CP

$4+(3+5) = (4+3)+5$ AP

$8+4+7 = 7+4+8$ CP

$4+(2 \cdot 3) = 4 \cdot 2 + 4 \cdot 3$ DP

$x+(r+y) = (r+y)+x$ AP

$6 \cdot 4 + 6 \cdot 3 = 6 \cdot (4 \cdot 3)$ DP

Fill in the Blank

$2 \times 15 = 15 \times$ 2

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

Which is an example of the associative property?

- a.) $(a+b)+c = a+(b+c)$
- b.) $a+b = b+a$
- c.) $a+0 = a$

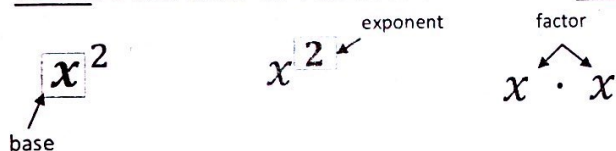
Exponents

EXPONENTS VOCABULARY

I can write numbers using exponents.
 I can write numerical expressions using exponents.
 I can find the values of numbers written in exponential form.
 I can evaluate and write exponents.

EXPONENTS: repeated multiplication – how many times the base is used as a factor

BASE: a number or variable to use as a factor



VOCABULARY WE ALREADY
KNOW:

factor: a number that is being multiplied to get a product

EXPONENTIAL FORM: *short way to write repeated multiplication*

$$5^3$$

EXPANDED FORM: *long way to write repeated multiplication*

$$5 \cdot 5 \cdot 5$$

STANDARD FORM: the product of exponential form

$$125$$

POWER: a number that can be expressed using an exponent

$$5^3 = \text{five to the third power}$$

SQUARED: a base raised to the second power

$$5^2$$

CUBED: a base raised to the third power

$$5^3$$

6.EE.A.1: Write and evaluate numerical expressions involving whole number exponents

Location, Location, Location...

Exponential form

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$$

Labels: Exponent (5), Product (32), Base (2), Expanded form (2 · 2 · 2 · 2 · 2)

Write the following as exponents

$$4 \times 4 \times 4 = 4^3$$

$$5 \times 5 \times 5 \times 5 \times 5 = 5^5$$

$$8 \times 8 = 8^2$$

Write the following in expanded notation

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$3^2 = 3 \cdot 3$$

$$8^3 = 8 \cdot 8 \cdot 8$$

Evaluate the following (solve)

$$3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = \boxed{81}$$

$$12^2 = 12 \cdot 12 = \boxed{144}$$

$$3^5 = 3 \times 3 \times 3 \times 3 \times 3$$

Handwritten work: 9 x 9 x 3

$$81 \times 3$$

$$243$$

$$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$$

$$4 \cdot 2$$

$$8 \cdot 2 = 16$$

Order of Operations

P () [] { }

Parenthesis

$$4^2(17-15)/(3+1)-5+2$$

$$4^2(2)/(4)-5+2$$

E xponents

\times^3

$$4^2(2)/(4)-5+2$$

$$4 \times 4$$

$$16(2)/(4)-5+2$$

M Multiply \times

From left to right

which ever comes first

comes first

Divide \div

$N \div D \frac{N}{D} / \frac{\circ}{\circ}$

$$16(2)/(4)-5+2$$

$$32/(4)-5+2$$

$$32/4-5+2$$

$$8-5+2$$

YOUR TURN ☺

Add

From left to right which ever comes first

Subtract

$$8-5+2$$

$$3+2$$

$$\textcircled{5}$$

Order of Operations

Example: $8 \div (1+3) \times 5^2 - 2$

$$8 \div 4 \times 5^2 - 2$$

$$8 \div 4 \times (5 \cdot 5) - 2$$

$$8 \div 4 \times 25 - 2$$

$$8 \div 4 \times 25 - 2$$

$$2 \times 25 - 2$$

$$50 - 2$$

$$50 - 2$$

$$48$$

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Variables, Algebraic Expressions & Like Terms

$$r = 1r$$

$$z = 1z$$

$$b = 1b$$

Algebraic Expressions and Terms



An algebraic expression is a mathematical combination of

constants and variables combined using the major operations

Examples

$3x - 5$

$6y - 8x + 2$

$3x^2 + x - 2$

A term is a constants or set of variable variables made

with multiplication. They are combined using addition/ subtraction to make algebraic expressions

Examples

$(3x) \cdot (5)$

$(6y) \cdot (8x) \cdot (2)$

$(3x^2) \cdot (x) \cdot (2)$

Like Terms



Like terms are terms that have the exact same variable and exponent.

The coefficients in these terms do not need to be the same. constants are always considered like terms.

Common Categorization Methods

Underlining

$4x^2 - 2y + 3x + 2 - 4y + 7 + z + x^2$

Shapes

$4x^2 - 2y + 3x + 2 - 4y + 7 + z + x^2$

HELPFUL HINT

The number of categories equals the number of terms in your final answer. Include the sign when you categorize.

Variables Algebraic Expressions & Like Terms

Variables vs. Constants

A variable is a Symbol that represents a value that is unknown and not constant. They are often represented by a letter such as x or y.

A constant is a known and well defined value.

Draw a box around the sets of variables. Draw a circle around the constants.

3 x 2 xy 3x 2y -12 -12x
 8.2 z -5z 32 9.8 -43b c ab



Coefficients

If you put 2 rabbits next to each other, they multiply



If you put 2 values next to each other, they multiply

$$2x = 2 \cdot x$$

$$abc = a \cdot b \cdot c$$

$$-4xyz = \underline{\hspace{2cm}}$$

The value in front of a variable is the coefficient. It tells you how many "sets" of that variable you are dealing with. This is the value that is being multiplied by the variable.

Circle the coefficients.

3y -2x 19xyz 4ab -13x 2 -12x 142n



$$\text{3z} + 4 - 2c + 4z + 8$$

$$7z + 12 - 2c$$

Variables Algebraic Expressions

Translations

Translating Words to Math

| Addition (Combine) "and" | Subtraction (Less) | Multiplication (Put together groups of equal parts) | Division (Separate into equal groups) |
|---|--|---|---|
| Sum Total Add Plus Increased by | Difference Subtract Minus Take away | Product Multiply Times Each | Quotient Divide |
| More Than ** | Subtracted from ** Less Than ** | | |
| 3 plus 5 | 6 minus 4 | 3 times x | h divided by 6 |
| $3 + 5$ | $6 - 4$ | $3 \cdot x$ | $h \div 6$ |
| 5 more than 3 | 4 less than 6 | $3x$ | $h/6$ |
| $3 + 5$ | $6 - 4$ | | $\frac{h}{6}$ |

****Switching Terms** – Terms that flip the placement of the operation to the end of the sentence, equation, or expression.

**What you SEE first in the sentence or problem

is what you

WRITE first in the equation or expression**

Examples.

4 less the amount of y divided by 8

$$y \div 8 - 4$$

The quotient of q and 3

$$q \div 3$$

The sum of 15 divided by b and 6

$$15 \div b + 6$$

13 multiplied by the amount 60 minus w

$$13 \cdot (60 - w)$$

Twice the sum of a number and 600

$$2(n + 600)$$