Math 6: Week of May 11th

Unit: Introduction to Algebra

Lesson 5: Number Properties
Target: Recognize and use the Commutative and Associative Properties.

Lesson 6: Variables and Expressions
Target: Write expressions involving variables.

Directions:

- Go through the slides (notes) and work through the examples on a separate piece of paper. If you have your math notebook, use it!
- Complete the practice problems on a separate piece of paper.
- Check your answers with the key given at the end of the lesson. If you got one wrong, double check your steps with your notes and recalculate it.
- Are you stuck?
  1. Use Google Classroom or Gmail to ask Mrs. Thomas a question.
  2. Live video helps sessions: Thursdays at 9:30am using Meet through Google Classroom

Lesson #5: Number Properties

Properties of Addition and Multiplication

★ Commutative Property: The ***order*** in which numbers are added or multiplied does not change the value of an expression.

Examples:

$5 + 3 = 3 + 5$ $\quad$ $4 \times 6 = 6 \times 4$

★ Associative Property: The way in which numbers are *grouped* in addition and multiplication expressions does not change the value of the expression.

Examples:

$2 + (4 + 7) = (2 + 4) + 7$ $\quad$ $5 \times (8 \times 3) = (5 \times 8) \times 3$

Example 1

Determine if the expressions are *equal*. If so, name the property.

$(3 + 2) + 9$ $\quad$ $3 + (2 + 9)$

1. Solve each expression.
   $(3 + 2) + 9 = 5 + 9 = 14$
   $3 + (2 + 9) = 3 + 11 = 14$
2. They are the same, both 14.
3. Associative Property –
   They are grouped differently.

Example 2

Determine if the expressions are *equal*. If so, name the property.

$8 \div 4$ $\quad$ $4 \div 8$

1. Solve each expression.
   $8 \div 4 = 2$
   $4 \div 8 = 0.5$
2. They are not the same.
3. The Commutative Property does not work with division.

Example 3

Determine if the expressions are *equal*. If so, name the property.

$10 \times (4 - 2)$ $\quad$ $(10 \times 4) - 2$

1. Solve each expression.
   $10 \times (4 - 2) = 10 \times 2 = 20$
   $(10 \times 4) - 2 = 40 - 2 = 38$
2. They are not the same.
3. The Associative Property only works when using one operation at a time.

Example 4

Determine if the expressions are *equal*. If so, name the property.

5×11 $\quad$ 11×5

1. Solve each expression.
   $5 \times 11 = 55$
   $11 \times 5 = 55$
2. They are the same.
3. Commutative Property – The numbers changed places.

Lesson #6: Variables and Expressions

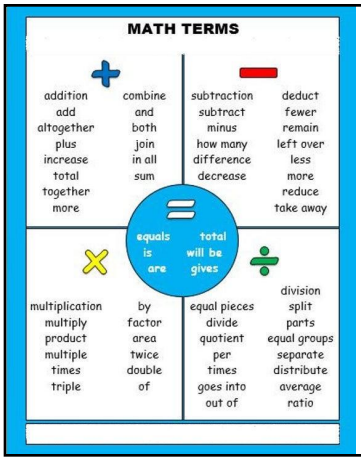
Vocabulary

- Variable: A letter that stands for a number. (Any letter of the alphabet but X and Y are the most common.)
- Algebraic Expression: A mathematical expression that contains numbers, operations and variables.

Methods for Showing Multiplication

- Dot: $4 \cdot y$
- Parentheses: $4(y)$
- Number and adjacent variable: $4y$

When we use x in algebra it now looks like a variable, not the multiplication symbol!



Use these key words to help translate each algebraic expression!

Move on to the examples on the next slide to help explain what it means!

Examples ~ Writing Algebraic Expressions

Write an algebraic expression for each phrase.

1. five times *k*

$5k$ or $5(k)$ or $5 \cdot k$

2. seven more than *x*

$x + 7$

3. *f* divided by 2

$f \div 2$ or $\frac{f}{2}$

4. a number *y* is decreased by six

$y - 6$

5. eleven plus four times *w*

$11 + 4w$
or
$11 + 4(w)$
or
$11 + 4 \cdot w$

Examples ~ Writing Phrases

There are many different ways to write these phrases. Use the Math Terms chart to help guide you.

Write a phrase for each algebraic expression.

1. $12 + t$

the sum of twelve and t

twelve plus t

2. $8x$

the product of eight and x

eight times x

8 multiplied by x

3. $u - 5$

five less than u

u minus 5

4. $3x - 2$

three times x minus two

two less than the product of three and x

Practice Problems: Worksheets

Lesson 5 ~ Number Properties
Lesson 6 ~ Variables and Expressions

Check your work!

Worksheet Answers Provided Here!

If you're stuck, ASK! Live Meet help sessions are provided every Thursday at 9:30am. Check Google Classroom for more information.

Worksheet 5

1. Associative
2. Commutative
3. Commutative
4. Associative
5. Associative
6. Commutative
7. Associative
8. Commutative
9. False
10. True, Associative
11. True, Commutative
12. False
13. $11 \times 5 \times 2$ or $2 \times 5 \times 11$ or $5 \times 2 \times 11$ or $11 \times 5 \times 2$ or $5 \times 11 \times 2$
14. $(7 + 4) + 6$

Worksheet 6

1. $d - 3$
2. $7 + h$
3. $t + 6$
4. $3k$
5. $12w$
6. $y \div 5$
7. $8 + p$
8. $n - 6$
9. $f - 20$
10. $2z + 9$
11. y, less than 25
12. 11 more than t
13. 6 less than z
14. 8 times p
15. Answers may vary
    a. 8 more than n
    b. the sum of n and 8
16. Answers may vary
    a. x less than 16
    b. x subtracted from 16

#11-16 Answers can vary: There are many different operation words to choose from.

Lesson 5 ~ Number Properties

Name_____ Period_____ Date_____

Identify the property shown by each equation.

1. $7+(3+5)=(7+3)+5$

2. $6+7+3=7+3+6$

3. $3\times 8=8\times 3$

4. $(5\times 2)\times 7=5\times(2\times 7)$

5. $(3+4)+8=3+(4+8)$

6. $3\times 4\times 5=4\times 3\times 5$

7. $(2\times 4)\times 5=2\times(4\times 5)$

8. $4\times 9\times 2=2\times 9\times 4$

Circle if each equation is true or false. If the equation is true, identify the property shown.

9. $8-(4-3)=(8-4)-3$ True or False Property: _____

10. $(6\times 2)\times 4=6\times(2\times 4)$ True or False Property: _____

11. $13+6=6+13$ True or False Property: _____

12. $9\div 3=3\div 9$ True or False Property: _____

13. Use the Commutative Property to write the numerical expression $2\times 11\times 5$ two other ways.

a) b)

14. Use the Associative Property to write the numerical expression $7+(4+6)$ one other way.

Lesson 6 ~ Variables and Expressions

Name_____ Period_____ Date_____

Write an algebraic expression for each phrase.

1. *d* decreased by three

2. seven divided by *h*

3. the sum of *t* and six

4. three times *k*

5. the product of *w* and twelve

6. the quotient of *y* and five

7. eight more than *p*

8. six subtracted from *n*

9. twenty less than *f*

10. two times a number *z* plus nine

Write a word phrase for each algebraic expression.

11. $25 - y$

12. $t + 11$

13. $z - 6$

14. $8 \cdot p$

15. Write two different word phrases for $n + 8$.

a)

b)

16. Write two different word phrases for $16 - x$.

a)

b)