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Summer Edition

Sixth Grade
Math

Activity 4

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This packet includes four sections that cover the major content of 6th grade math. Each section includes four pages of notes and practice for each topic. For additional support, visit KCS TV on YouTube for instructional videos that accompany each section.

The following content is included in this packet:

	Topic			
	I. Area of Polygons	**II. Ratio Reasoning**	**III. Rational Numbers**	**IV. Equations and Expressions**
Activity 1	Area of Quadrilaterals	Rates	Dividing Mixed Numbers	Order of Operations
Activity 2	Area of Triangles	Ratios, Rates, Tables, and Graphs	Adding and Subtracting Decimals	Addition and Subtraction Equations
Activity 3	Solving Area Problems	Solving Problems with Proportions	Multiply Decimals	Evaluating Expressions
Activity 4	Area of Polygons	Understanding Percent	Dividing Decimals	Generating Equivalent Expressions

Name _____ Date _____ Class _____

Section IV Activity 1

Order of Operations

A mathematical phrase that includes only numbers and operations is called a *numerical expression*.

$9 + 8 \times 3 \div 6$ is a numerical expression.

When you evaluate a numerical expression, you find its value.

You can use the order of operations to evaluate a numerical expression.

Order of operations:

1. Do all operations within *parentheses*.
2. Find the values of numbers with *exponents*.
3. *Multiply* and *divide* in order from left to right.
4. *Add* and *subtract* in order from left to right.

Evaluate the expression.

$60 \div (7 + 3) + 3^2$

$60 \div 10 + 3^2$	Do all operations within parentheses.
$60 \div 10 + 9$	Find the values of numbers with exponents.
$6 + 9$	Multiply and divide in order from left to right.
15	Add and subtract in order from left to right.

Simplify each numerical expression.

1. $7 \times (12 + 8) - 6$

   $7 \times$ _____ $- 6$

   _____ $- 6$

   _____

2. $10 \times (12 + 34) + 3$

   $10 \times$ _____ $+ 3$

   _____ $+ 3$

   _____

3. $10 + (6 \times 5) - 7$

   $10 +$ _____ $- 7$

   _____ $- 7$

   _____

4. $2^3 + (10 - 4)$

   _____

5. $7 + 3 \times (8 + 5)$

   _____

6. $36 \div 4 + 11 \times 8$

   _____

7. $5^2 - (2 \times 8) + 9$

   _____

8. $3 \times (12 \div 4) - 2^2$

   _____

9. $(3^3 + 10) - 2$

   _____

Solve.

10. Write and evaluate your own numerical expression. Use parentheses, exponents, and at least two operations.

    _____

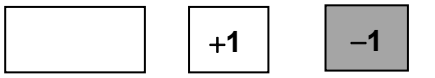
Name _____ Date _____ Class _____

Section IV Activity 2

Addition and Subtraction Equations

To solve an equation, you need to get the variable alone on one side of the equal sign.

You can use tiles to help you solve subtraction equations.

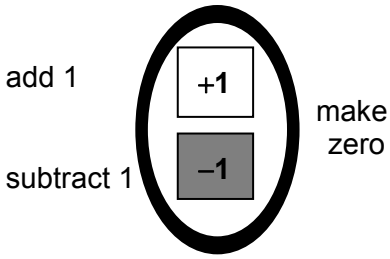


Variable add 1 subtract 1

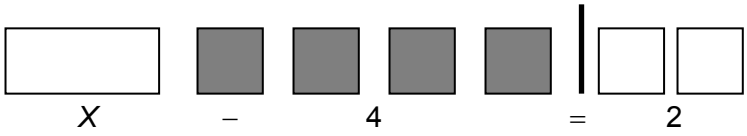
Addition undoes subtraction, so you can use addition to solve subtraction equations.

One positive tile and one negative tile make a **zero pair**.

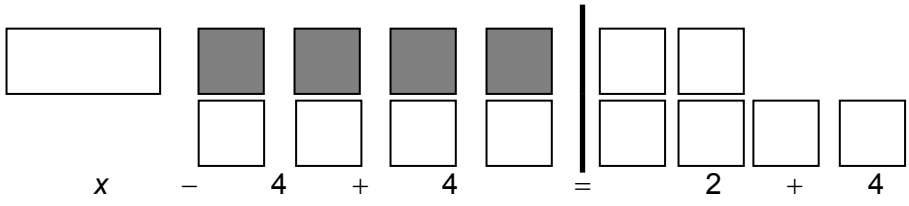
Zero pair: $+1 + (-1) = 0$



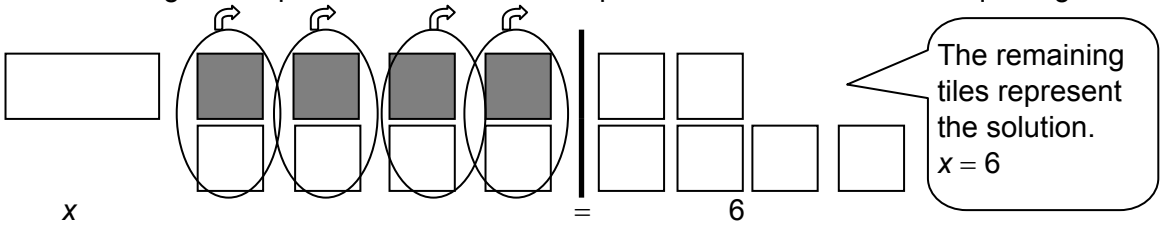
To solve $x - 4 = 2$, first use tiles to model the equation.



To get the variable alone, you have to add positive tiles. Remember to add the same number of positive tiles to each side of the equation.



Then remove the greatest possible number of zero pairs from each side of the equal sign.



Use tiles to solve each equation.

1. $x - 5 = 3$

   $x =$ ____

2. $x - 2 = 7$

   $x =$ ____

3. $x - 1 = 4$

   $x =$ ____

4. $x - 8 = 1$

   $x =$ ____

5. $x - 3 = 3$

   $x =$ ____

6. $x - 6 = 2$

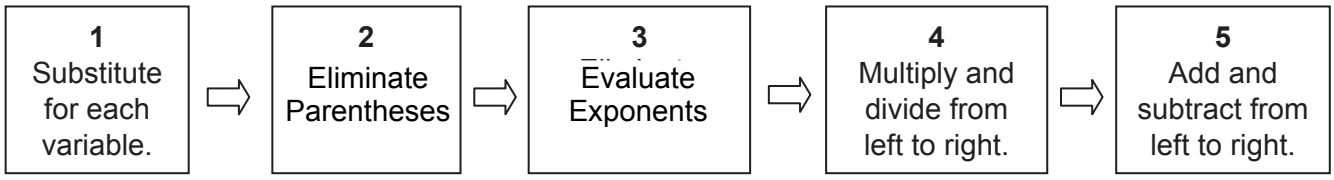
   $x =$ ____

Name _____ Date _____ Class _____

Section IV Activity 3

Evaluating Expressions

A flowchart gives you a plan. You can use a flowchart to evaluate expressions.



Evaluate $x^2 - 3(4 + 1)$ when $x = 7$.

$x^2 - 3(4 + 1)$

$7^2 - 3(4 + 1)$

$7^2 - 3(\mathbf{5})$

$49 - \mathbf{15}$

34

Plan
1 Substitute for each variable.
2 Eliminate Parentheses
3 Evaluate Exponents
4 Multiply and divide from left to right.
5 Add and subtract from left to right.

Evaluate $(2n + 8) \div t - 2$ when $n = 6$ and $t = 5$.

$(2 \bullet \mathbf{6} + 8) \div \mathbf{5} - 2$

There are no exponents.

$\mathbf{(12 + 8)} \div 5 - 2$
$\mathbf{20} \div 5 - 2$

$\mathbf{4} - 2$

2

Use the flowchart to evaluate each expression.

1.

Plan	Evaluate $(5 + y) - 3^2$ when $y = 14$.
1 Substitute for each variable.	
2 Eliminate Parentheses	
3 Evaluate Exponents	
4 Multiply and divide from left to right.	
5 Add and subtract from left to right.	

2.

Plan	Evaluate $m^2 - 2(3p + 6)$ when $m = 10$ and $p = 4$.
1 Substitute for each variable.	
2 Eliminate Parentheses	
3 Eliminate Parentheses	
4 Multiply and divide from left to right.	
5 Add and subtract from left to right.	

Name _____ Date _____ Class _____

Section IV Activity 4

Generating Equivalent Expressions

Look at the following expressions: $x = 1x$
$x + x = 2x$
$x + x + x = 3x$

The numbers 1, 2, and 3 are called **coefficients** of x.

Identify each coefficient.

1. $8x$ ____ 2. $3m$ ____ 3. y ____ 4. $14t$ ____

An algebraic expression has terms that are separated by + and −.
In the expression $2x + 5y$, the **terms** are $2x$ and $5y$.

Expression	Terms
$8x + 4y$	$8x$ and $4y$
$5m - 2m + 9$	$5m$, $-2m$, and 9
$4a^2 - 2b + c - 2a^2$	$4a^2$, $-2b$, c, and $-2a^2$

Sometimes the terms of an expression can be combined.
Only **like terms** can be combined.

$2x + 2y$ NOT like terms, the variables are different.

$4a^2 - 2a$ NOT like terms, the exponents are different.

$5m - 2m$ Like terms, the variables and exponents are both the same.

$n^3 + 2n^3$ Like terms, the variables and exponents are both the same.

To **simplify** an expression, combine like terms by adding or subtracting the coefficients of the variable.

$\mathbf{5}m - \mathbf{2}m = \mathbf{3}m$

$4a^2 + \mathbf{5}a + \mathbf{a} + 3 = 4a^2 + \mathbf{6}a + 3$ Note that the coefficient of a is 1.

Simplify.

5. $8x + 2x$ _____
6. $3m - m$ _____
7. $6y + 6y$ _____
8. $14t - 3t$ _____
9. $3b + b + 6$ _____
10. $9a - 3a + 4$ _____
11. $n + 5n - 3c$ _____
12. $12d - 2d + e$ _____

Answer Key

IV. Equations and Expressions

Activity 1: Order of Operations

1. 20; 140; 134
2. 46; 460; 463
3. 30; 40; 33
4. 14
5. 46
6. 97
7. 18
8. 5
9. 35
10. Answers will vary. Sample answer
    $3^2 + (4 \times 5) - 5^2 = 4$

Activity 2: Addition and Subtraction Equations

1. 8
2. 9
3. 5
4. 9
5. 6
6. 8

Activity 3: Evaluating Equations

1. $(5 + 14) - 3^2$;
   $(5 + 14) - 9$;
   $19 - 9$;
   There is no multiplication or division;
   10

2. $10^2 - 2(3 \bullet 4 + 6)$;
   $100 - 2(12 + 6)$;
   $100 - 2 \bullet 18$;
   $100 - 36$;
   64

Activity 4: Generating Equivalent Expressions

1. 8
2. 3
3. 1
4. 14
5. $10x$
6. $2m$
7. $12y$
8. $11t$
9. $4b + 6$
10. $6a + 4$
11. $6n - 3c$
12. $10d + e$