**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per.\_\_\_\_\_\_\_**

**U1 CW #1 Simplifying Expressions**

**Order of Operations:** The order of operations are a set of rules for how to evaluate expressions. They make sure everyone gets to the same answer.

**P**arentheses: Evaluate what's inside parentheses first, if we can, before anything else.

 Ex: $ 2\left(3+2\right)-4 7-\left(11-4\right)÷2 13+2\left(2x-3\right) 2-\left(6\right)+4(5-3) $

**E**xponents: Next, evaluate exponents, if any.

 Ex: $ 2+3^{2}-4 2\left(3^{4}÷2\right)+1 $

**M**ultiplication and **D**ivision: Then, multiply and divide, if we can, in order from left to right.

 Ex: $ 2+3÷2-4\left(2\right) 12• x+(9÷3)$

**A**ddition and **S**ubtraction: Lastly, we add and subtract, if possible, from left to right.

 Ex: $ 2^{3}-4+2•3 6+4x-2x+12$

Let’s try a few: Simplify the expression.

|  |  |  |
| --- | --- | --- |
| 1. $6•4+6÷2$
 | 1. $(7-2+3)÷2$
 | 1. $6^{2}-2(3+4-1)$
 |

**Combining Like Terms**: We call terms "like terms" if they have the same variable or lack of a variable. We combine like terms into one term by adding or subtracting the coefficient in front of the variables, remember to include the sign(s).

Ex: 6 and -3 are like terms, but 6 and -3x are not like terms.

 4x and 3x are like terms, but 4x and 3w are not like terms.

Let’s try a few: Simplify each expression by combining like terms.

|  |  |  |
| --- | --- | --- |
| 1. $3+12x+(-4x)+1$
 | 1. $2x+3-4x$
 | 1. $3y+1-2x-y-4$
 |

**Distribution:** Multiply the constant or variable outside of a parenthesis to every term inside the parentheses, watch the signs in front of each term. We most often use distribution when we have expressions that include variables as well as constants.

Ex:$ 2\left(3+x\right) -8\left(-2y-4\right) x\left(2-4x\right) 2\left(6+4\right) $

Note: While the term you multiply by is often before the ( ), it is not always.

 Ex: $ \left(x-5\right)2 \left(2y+24\right)3 \left(-x-4\right)\left(-3\right) -(2x-5) $ Non Ex: $\left(y-7\right)-1$

Let’s try a few: Simplify using distribution.

|  |  |  |
| --- | --- | --- |
| 1. $4(11-y)$
 | 1. $-2(-3+4y)$
 | 1. $3(-2x-5y)$
 |
| 1. $2(x-4+y)$
 | 1. $\left(3x+2\right)7$
 | 1. $4x(3x-12)$
 |

**Substitution:** "Substitute" means to put in the place of another. Substitution in math means to put a numerical value (number) in the place of a variable (letter) and follow order of operations to simplify to its simplest form.

 **Ex:** $2x-3$ what is the value when x=4?

 Plug in the number 4 anytime you see the variable x and then simplify.

$$2\left(4\right)-3=8-3=5$$

Let’s try a few: what is the value of each when $x=2$ and $y=-3$

|  |  |  |
| --- | --- | --- |
| 1. $4x-11$
 | 1. $-2-3x+4x$
 | 1. $3(-2x-5y)$
 |

**Equivalent Expressions**: Equivalent expressions are expressions that have the same value, even though they may look a little different. If you plug the same variable value into equivalent expressions, they will each give you the same value when you simplify.

 Let’s look at the expressions $x+x+x $and$ 3x$. If we substitute in the value of for x both expressions will have the same final value after substitution and simplifying using order of operations, they are equivalent.

$$x+x+x 3x $$

$$4+4+4=12 3\left(4\right)=12$$

The two expressions are equivalent expressions. You can rewrite one expression into the other by combining or separating like terms.

 $3x+2-x+3 $

 $2x+5$

The two expressions are equivalent expressions. You can rewrite one expression into the other by distributing or factoring a common constant or variable.

$$ 2\left(x-4\right)$$

$$2x-8$$

Let’s try a few: Write 2 equivalent expressions for each

|  |  |  |
| --- | --- | --- |
| 1. $4(11-y)$
 | 1. $-2x+12y$
 | 1. $-6-2x-5y$
 |

**Simplifying Expressions Scavenger Hunt**

Around the room you will find 12 expression that you will use the skills we review today to simplify expressions.

**Directions:** Simplify each expression to it most simple form showing all your work. Record your work and answer in the correctly numbered box on the answer sheet. Circle your final answer. Once you have an answer to a question, find that answer on the top of another question card. This is the next problem you must solve. You may start at any problem.

Hint: If you cannot find the answer you have and have checked all 12 problems, go back and check your work. You may have made an error. Use the notes on this side of the page to help you.