Lesson Title 2.2 Addition & Multiplication POE NOTES **B2A2** **Date** _____

VOCAB: *Define in your own words.*

Expression: combinations of #'s & variables

Equation: two expressions set =

solution: (answer, root) to an equation, TRUE ✓

linear equation in one variable: $ax+b=c$, power of 1

equivalent equations: when answers are the same for different equations

***OBJECTIVE 3:* Using Both the Addition & Multiplication POE**

Task 8: Solve and show each step.

a) $12a - 8a = 10 + 2a - 13 - 7$

$4a = -10 + 2a$

$-2a \quad -2a$

$\frac{2a}{2} = \frac{-10}{2}$

$a = -5$

b) $6b - 11b = 18 + 2b - 6 + 9$

$-5b = 21 + 2b$

$-2b \quad -2b$

$\frac{-7b}{-7} = \frac{21}{-7}$

$b = -3$

***OBJECTIVE 1:* Addition Property of Equality (POE)**

Remember hearing "What you do to one side you need to do to the other side of the =?"

This is to make sure the equation stays balanced or equal. This POE helps us solve equations by adding or subtracting the same number from both sides of the equation.

Task 1: *Solve for x by getting the variable alone using reverse PEMDAS. Show all steps.*

a) $x - 7 = 10$ → $+7 \quad +7$ → $x = 17$

b) $x + 3 = -5$ → $-3 \quad -3$ → $x = -8$

Task 2: Solve for y. Show all steps.

a) $y + 0.6 = -1.0$ → $-0.6 \quad -0.6$ → $y = -1.6$

b) $y - 0.3 = -2.1$ → $+0.3 \quad +0.3$ → $y = -1.8$

Task 3: Solve the equation. Show all steps.

a) $2x + 3x - 5 + 7 = 10x + 3 - 6x - 4$

$5x + 2 = 4x - 1$

$-4x \quad -4x$

$x + 2 = -1$

$-2 \quad -2$

$x = -3$

b) $8x - 5x - 3 + 9 = x + x + 3 - 7$

$3x + 6 = 2x - 4$

$-2x \quad -2x$

$x + 6 = -4$

$-6 \quad -6$

$x = -10$

Task 4: Solve and show each of the steps.

a) $7 = 5(2a - 1) - (-11a + 6)$

$7 = 10a - 5 + 11a - 6$

$7 = 21a - 11$

$+11 \quad +11$

$18 = 21a$

$a = \frac{18}{21} = \frac{6}{7}$

b) $2 = 4(2a - 3) - (7a + 4)$

$2 = 8a - 12 - 7a - 4$

$2 = a - 16$

$+16 \quad +16$

$a = 18$

OBJECTIVE 2: *Using the Multiplication Property of Equality (POE)*

This helps us solve equations by multiplying both sides of an equation by the same number. It works the same with division.

Task 5: Solve and show each step.

a) $\frac{5}{2}x = 15$ ·2

$5x = 30$

$\frac{5x}{5} = \frac{30}{5}$

$x = 6$

b) $\frac{4}{5}x = 16$ ·5

$4x = 80$

$\frac{4x}{4} = \frac{80}{4}$

$x = 20$

Task 6: Solve and show each step.

a) $-3c = 33$

$\frac{-3c}{-3} = \frac{33}{-3}$

$c = -11$

b) $8m = -96$

$\frac{8m}{8} = \frac{-96}{8}$

$m = -12$

Task 7: Solve and show each step.

a) $\frac{y}{7} = 20$ ·7

$y = 20 \cdot 7$

$y = 140$

b) $\frac{x}{5} = 13$

$\frac{1}{5}x = 13 \cdot 5$

$x = 65$

OBJECTIVE 4: *Writing Word Phrases as Algebraic Expressions*

Task 9: Write the equation AND solve.

a) The sum of two numbers is 8. If one number is 3, find the other number. $x + y = 8$ $3 + y = 8$ 5

b) The sum of two numbers is eight. If one number is x, write an expression representing the other number.

$y =$ ____ $x + y = 8$ $-x \quad -x$ $8 - x$

c) An 8-foot board is cut into two pieces. If one piece is x feet, express the length of the other piece in terms of x.

x / $8 - x$ $8 - x$

Task 10: If x is the first of three consecutive integers, express the sum of three integers in terms of x. Simplify if possible.

$x, x+1, x+2 \rightarrow (x) + (x+1) + (x+2) = 3x + 3$

SUMMARY

1) The difference between an equation and an expression is that a(n) equation contains an equal sign, whereas an expression does not.
2) equivalent equations are equations that have the same solution.
3) A value of the variables that makes an equation a true statement is called a(n) solution of the equation.
4) The process of finding the solution of an equation is called solving the equation for the variable.
5) By the Addition POE, x = - 2 and x + 10 = - 2 + 10 are equivalent equations.
6) By the Addition POE, x = -7 and x – 5 = - 7 – 5 are equivalent equations.
7) By the Multiplication POE, y = 0.5 and 5 (y) = 5 (0.5) are equivalent equations.
8) By the Multiplication POE, $9x = -63$ and $\frac{9x}{9} = \frac{-63}{9}$ are equivalent equations.
9) TRUE or FALSE: The equations x = 0.5 and 0.5 = x are equivalent equations. True
10) TRUE or FALSE: The equations $\frac{z}{4} = 10$ *and* $4 \cdot \frac{z}{4} = 10$ are equivalent equations. False

Still need help with: