Ana Tracy

**UNIT:** Functions

**LESSON:** Equalities

**Academic Standards:
> 2.5.G.A:** Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.

**> 2.8.8.E:** Use combinations of symbols and numbers to create expressions, equations in one or two variables, and inequalities in one variable that model problem situations.

**>**[**2.8.7.E**: Use combinations of symbols and numbers to create expressions, equations, and inequalities in one variable that model problem situations.](http://www.pdesas.org/Standard/StandardsBrowser/25649%20%5C%2025649)

**Assessment Anchors:**

**>M7.D.2:** Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.

**>M8.D.2.1:** Select and/or use strategy to simplify an expression, solve an equation or inequality and/or check the solution for accuracy.

**>M8.D.2.2:** Create and/or interpret expressions, equations or inequalities that model problem situations.

**MATERIALS and TECHNOLOGY:**  Math textbooks, scales, handouts of problems, calculators, computer, PowerPoint, and blackboard.

**MOTIVATIONAL DEVICE:** The teacher will pass out a worksheet of problems, which contains addition, subtraction, division and multiplication properties.

**INSTRUCTIONAL OBJECTIVES:**

**1.**  Given an example of equation, students will be able to solve it by using addition and multiplication properties within 90 % accuracy.

**2.**  When given an example of equation containing fractions, students will be able to solve it by using multiplication property each time asked.

**3.** When given an example containing variables on both sides of the equation, students will be able to solve it by getting all the variables on the one side of the equation, each time asked.

**LESSON OUTLINE:**

**I.** Introduction (3 minutes)

· Worksheet- the students will complete as many problems as they can in 2 min.

**II.** Content and Pedagogy (38 min)

**A.** An example of solving an equation using addition and multiplication properties provided by the teacher ( 2 min)

-List the following problem on the blackboard:
**3x+4 =13**
*Solution*: solve for X.

Use the addition property to subtract 4 from both sides of the equation.

3x+4-4=13-4. The answer is 3x= 9. Then by use multiplication property to divide both sides by 3. 3x/3= 9/3. The answer is x=3.

*Check the answer*: 3(3) +4 = 12.

 12=12. The answer is correct.

**B.** An example of solving a problem containing fractions by using a multiplication property . (3 minutes)

–List the following problem on the blackboard:
 **½ x + 2= 6**

*Solution*: solve for x.

Use the addition property to subtract 2 from both sides. ½ x+2-2=6-2. The answer is ½ x = 4. Then use the multiplication property to multiply by both sides by the denominator 2. (2) ½ x = 4(2). The answer is x = 8.

*Check the answer*: ½ (8) = 4

 4=4. The answer is correct.

**C.**  An example of an equation containing variable on both sides of the equation provided by the teacher. (3 minutes)

– List the following problem on the blackboard:
**2x -2 = -3x +3.**

*Solution*: Solve for x.

Use the addition property to get all variables of x on one side of the equation by adding 3x to both sides. 2x +3x -2= -3x + 3x +3. The answer is 5x-2= 3. Then use the addition property to add 2 to both sides. The answer is 5x = 5. The last step is to use the multiplication property to divide 5 by both sides. The answer is x = 1.

*Check the answer*: 2(1) – 2 = -3(1) +3.

 0 = 0. The answer is correct.

**D.** After completing these problems on the board the teacher will divide a class in half (names for the groups provided by the teacher) and will use PowerPoint to play a game with a class. (30 min)

· One student is selected to read the questions to the class. (Name is provided by the teacher)

· The students will answer questions by raising their hand and take notes on the material presented (if they desire to do so).

· If the students provide the wrong answers, please just continue with the game until all the questions are answered.

· When all the questions are answered, please proceed to the conclusion of the lesson.

**III.** Summary (4 minutes)

**A.**  Ask the key questions.

**B.** Tell the students that during the next lesson, students will be introduced to inequalities.

**KEY QUESTIONS (3):**

· Which properties are of absolute necessity when solving for x?

· What do you need to do in order to clear the equation of fractions?

· How do you solve an equation that has variable on both sides of the equation?

**DIFFERENTIATED LEARNING ACTIVITIES:** Make sure that there is an even number of high level students in each group. Clear font and colors on the PowerPoint game for visually impaired students.

**FORMATIVE ASSESSMENT:** During the game students work together to answer the question on the PowerPoint. Students are periodically asked the questions throughout the lesson.

**REFLECTION:** Did the students gained necessary skills for the next lesson? Should have I provided more examples on the board? Did I finish the lesson within the time frame?

Necessary Knowledge to Become a Millionaire!!!!!!!!!!!!!!!!!!

**Addition Property of Equality:**

if a = b, then a + c = b + c

**Subtraction Property of Equality:**

if a = b, then a - c = b - c

**Multiplication Properties**

There are four properties involving multiplication that will help make problems easier to solve.

*Commutative property:* When two numbers are multiplied together, the product is the same regardless of the order of the multiplicands. For example 4 \* 2 = 2 \* 4

*Associative Property:* When three or more numbers are multiplied, the product is the same regardless of the grouping of the factors. For example (2 \* 3) \* 4 = 2 \* (3 \* 4)

*Multiplicative Identity Property:* The product of any number and one is that number. For example 5 \* 1 = 5.

*Distributive property:* The sum of two numbers times a third number is equal to the sum of each addend times the third number. For example 4 \* (6 + 3) = 4\*6 + 4\*3

**Division Property**

Division Property of Equality states that dividing both sides of an equation by a non-zero number doesn't affect the equation.
Example:
5p = 15
By dividing both sides of the equation by 5, we get p = 3.
Substituting p = 3 in the original equation will help us check the division property of equality.
5 × 3 = 15, it’s true!