

Solving Single Variable Equations

Started: September 3rd

Do Now

1. Please read the board—objectives, procedures, agenda and homework.
2. Please copy homework into agenda. Have homework out to show me when I come around.
3. Grab website direction sheet from table by the door.
4. Put nametag on desk. Have your covered textbook on your desk.
5. Attendance person—place take attendance.
Folder person—please pass out folders.
4. Please take out your completed pre-assessment and rubric.
5. Clear your desk of everything except your notebook and pre-assessment. Take out a writing utensil to correct your pre-assessment (marker or highlighter).

Website Directions

- Refer to your direction sheet

Pre-Assessment

- Let's grade it!
- Correct in a writing utensil other than the one you used!
- Once completed, place in your folder **ALONG** with your rubric!

Homework Review

In your group, go over each person's example and discuss.

1. Talk about your real situation.
2. Can you model it with an expression/equation?
3. What is the expression/equation?
4. For other people in the group, do you agree/disagree?
5. If you disagree, help the person revise it if necessary?
6. Can you use that situation to model another expression/equation?

Be prepared to discuss in 8 minutes.

General Rules for Writing Equations

Form: $3x + 2 = 7$ (Group 1)

Form: $(1/3)x + 2 = 4$ (Group 2 & 3)

Form: $(x/2) + 2 = 6$ (Group 4 & 5)

Form: $x + 2 = 7$ (Group 6)

How would each case be written in terms of the variable and coefficient?

Groups of something? Total items being divided?

Conceptual Understanding

We know how to solve the equations, but we need to work on defending our reasoning.

Defense

- Using mathematical properties to support your reasoning
- Using mathematical vocabulary

Foldable Setup

- Two pieces of letter paper
- 4 Levels

Solving Equations	
Expressions vs. Equations	
What is an Inverse Operation?	
Addition Property of Equality	Subtraction Property of Equality
Multiplication Property of Equality	Division Property of Equality

Expressions vs. Equations

Expressions

- Can't be solved
- Represents a situation or a number
- Can have a variable
- Can be a single number

Ex: x 2 $3x + 2$

Non ex: $3x + 2 = 5$

Equations

- Can be solved
- Shows two expressions are equal to each other
- Has variables
- Has coefficients
- Has constants

Ex: $4x + 4 = 12$

Non ex: $x + 3$

Expressions vs. Equations

Pictorial Representation
of Expression

Pictorial Representation
of Equation

What is an Inverse Operation?

- Operations that undo each other or that are opposites.
- Multiplication and Division are inverse operations

Picture

- Subtraction and Addition are inverse operations

Picture

Inverse Operation Connection

- Newton's Third Law (Science)

For every action, there is an equal and opposite reaction.

If a bird is flying, there is a force pushing down on it, but there is also a force pushing up on its wings.

[http://www.physicsclassroom.com/class/newtlaws/
Lesson-4/Newton-s-Third-Law](http://www.physicsclassroom.com/class/newtlaws/Lesson-4/Newton-s-Third-Law)

Analogy for Properties of Equality

- If someone pays you back, you say you are “even”
- If two people that weigh the same weight are on a see-saw, the see-saw is in balance or straight.

Addition Property of Equality

- Adding the same number to each side of an equation keeps the equation equivalent or in balance.

$$x - 3 = 2$$

Right now these two sides equal each other

$$x - 3 + 3 = 2 + 3$$

These two sides still equal each other, because we are doing the SAME thing to both sides!!!

Algebraic View of the Property:

Let a , b and c be real numbers.

Starting Equation: $a = b$

Apply Property $a + c = b + c$

Do Human Seesaw Example

Subtraction Property of Equality

- Subtracting the same number from each side of an equation keeps the equivalent or in balance.

$$x + 3 = 2$$

Both sides are equal.

$$x + 3 - 3 = 2 - 3$$

Since we are doing the same thing to both sides, the equation is still in balance/equal.

Algebraic View: Let a , b and c be real numbers.

Starting equation: $a = b$

Apply property: $a - c = b - c$

Multiplication Property of Equality

- Multiplying each side of an equation by the same number (other than zero) will keep the equation equivalent or in balance.

Starting equation: $x/3 = 2$

Apply property: $x/3 \times 3 = 2 \times 3$

Algebraic View: Let a , b and c be real numbers

Starting equation: $a = b$

Apply property $a \times c = b \times c$

Division Property of Equality

When you divide each side of the equation by a number (other than zero), the equation is equivalent or in balance.

These two expressions are equal : $5x = 20$

Doing the same thing to each side still keeps both sides equal

$$5x \ /5 = 20 \ /5$$

Algebraic View: Let a , b and c be real numbers.

Starting equation: $a = b$

Apply property $a/c = b/c$

Example of Defending Your Answer (PROOF)

Work

Reasoning

$$3x + 2 = 8$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

Subtraction Property of Equality

$$3x = 6$$

$$\begin{array}{r} \text{---} \\ 3 \end{array} \quad \begin{array}{r} \text{---} \\ 3 \end{array}$$

Division Property of Equality

$$x = 2$$

Try some...

You may work with people at your table or on your own.

Setup in two columns as I did on the previous slide.

In your textbook...

Pg. 85 (# 15, 19, 29, 41)

Pg. 91 (# 15, 17, 20)