

## Math 7H - Unit 2b

### Day 9 - Solving Multi-Step Equations by Combining Like Terms

#### Lesson Objectives:

- I can solve multi-step by combining like terms.
- I know how to show work when solving equations.

## Steps for Solving Equations

### Step #0 Simplify each side of the equation

- 0a Combine like terms
- 0b \*Coming Soon\*
- 0c \*Coming Next Year\*

### Step #1 Get rid of the constant

### Step #2 Get rid of the coefficient

The substitution property of equality says, if  $a = b$ , then  $b$  may be substituted for  $a$  in any expression containing  $a$ .

Model each equation on your algebra mat. Then sketch a picture in your notes.

Algebra mat representation of  $9 = 8 + 2x + 7$ . The mat shows 9 unit tiles on the left, 8 unit tiles and 2 x-tiles on the right, and 7 unit tiles on the right. A dashed box asks: "How can we simplify each side of the equation before trying to solve it?"

Handwritten work:

$$9 = 8 + 2x + 7$$

$$9 = 2x + 15$$

$$-15 \quad -15$$

$$-16 = 2x$$

$$\frac{-16}{2} = \frac{2x}{2}$$

$$-8 = x$$

Properties used: Substitution Prop. (=), Subtraction Prop. (-), Division Prop. (=)

Don't forget to check your work!

Model each equation on your algebra mat. Then sketch a picture in your notes.

Algebra mat representation of  $8x - 11 - 7x = -5$ . The mat shows 8 x-tiles, 11 unit tiles, and 7 x-tiles on the left, and 5 unit tiles on the right. A dashed box asks: "How can we simplify each side of the equation before trying to solve it?"

Handwritten work:

$$8x - 11 - 7x = -5$$

$$1x - 11 = -5$$

$$+11 \quad +11$$

$$x = 6$$

Properties used: Substitution Prop. (=), Subtraction Prop. (-)

Don't forget to check your work!

$$2w - 4w = -10$$

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

$$w = 5$$

Properties used: Substitution prop. (=), division prop. (=)

$$16 = w - 2w + 9$$

$$16 = -w + 9$$

$$-9 \quad -9$$

$$7 = -w$$

$$\frac{7}{-1} = \frac{-w}{-1}$$

$$-7 = w$$

Properties used: Substitution prop. (=), subtraction prop. (-), division prop. (=)

$$x + 3 + 4x + 5 = 15 + 16$$

$$5x + 8 = 31$$

$$-8 \quad -8$$

$$5x = 23$$

$$\frac{5x}{5} = \frac{23}{5}$$

$$x = \frac{23}{5}$$

Properties used: Substitution Prop. (=), Subtraction Prop. (-), Division Prop. (=)

$$18x + 51 - 47x = 225$$

$$-29x + 51 = 225$$

$$-51 \quad -51$$

$$-29x = 174$$

$$\frac{-29x}{-29} = \frac{174}{-29}$$

$$x = -6$$

Properties used: Substitution prop. (=), subtraction prop. (-), division prop. (=)

$$17x - 19 - 8x = 53$$

$$\begin{array}{r} 9x - 19 = 53 \text{ substitution prop(=)} \\ +19 \quad +19 \text{ addition prop(+)} \\ \hline 9x = 72 \text{ division prop(÷)} \\ \hline x = 8 \end{array}$$

$$53x - 18 + 7x = 162$$

$$\begin{array}{r} 60x - 18 = 162 \text{ substitution prop(=)} \\ +18 \quad +18 \text{ addition prop(+)} \\ \hline 60x = 180 \text{ division prop(÷)} \\ \hline x = 3 \end{array}$$

## Homework

### Solving Multi-Step Equations by Combining Like Terms WKS

\* Individual Think Time \*



What to do if you get stuck...

1. Reread the problem. Did you write it down correctly?
2. Reread your notes. Is there a problem similar that we did together in class?
3. Find a problem similar in your book. Try this one to see if it helps.
4. Skip the problem until the end of Individual Think Time. Then ask an "educated" question of a neighbor or Mrs. Call.

Today we're working by...

