



## Homework Section 2 Topic 2,3

**MAFS.912.A-REI.1.1:** Explain each step in solving a simple equation as follows from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

### Question #1:

For the equation  $4[a + (-7)] + 10[2a + 3] = 1$  select the correct justification for each step.

| Steps                             | Justifications |
|-----------------------------------|----------------|
| 1. $4[a + (-7)] + 10[2a + 3] = 1$ | 1. Given       |
| 2. $4a + (-28) + 20a + 30 = 1$    | 2.             |
| 3. $(-28) + 4a + 20a + 30 = 1$    | 3.             |
| 4. $(-28) + (4a + 20a) + 30 = 1$  | 4.             |
| 5. $(-28) + 24a + 30 = 1$         | 5. Addition    |

|  |   |
|--|---|
| <b>Addition Property<br/>of Equality</b>       | <b>Associative Property<br/>of Addition</b> |
| <b>Commutative Property<br/>Of Addition</b>    | <b>Distributive Property</b>                |
| <b>Multiplication Property<br/>of Equality</b> |   |

Question #2:

Thea solved the equation  $8(3x - 7) = -6(x + 7) + 4$  as shown.

|        |                             |
|--------|-----------------------------|
| Given  | $8(3x - 7) = -6(x + 7) + 4$ |
| Step 1 | $24x - 56 = -6x - 42 + 4$   |
| Step 2 | $24x - 56 = -6x + 46$       |
| Step 3 | $30x = 102$                 |
| Step 4 | $x = \frac{17}{5}$          |

Thea made an error between Step 1 and Step 2.

A. Explain the error that Thea made.

B. What is the solution to the original equation? Show your work and justify you steps.

|        |                             |               |
|--------|-----------------------------|---------------|
| Given  | $8(3x - 7) = -6(x + 7) + 4$ | Justification |
| Step 1 |                             |               |
| Step 2 |                             |               |
| Step 3 |                             |               |
| Step 4 |                             |               |

Closure Property

Distributive Property

Addition Property of Equality

Division Property of Equality

Symmetric Property of Equality.

Subtraction Property of Equality

Associative Property

Commutative Property

Combine Like Terms

Question #3:

Some of the steps in Randall's solution to  $2.5(6.25x + 0.5) = 11$  are shown.

| Statement                  | Reason                              |
|----------------------------|-------------------------------------|
| 1. $2.5(6.25x + 0.5) = 11$ | 1. Given                            |
| 2.                         | 2.                                  |
| 3.                         | 3. Subtraction property of equality |
| 4.                         | 4.                                  |

Select the correct reason to the box for line 4 of Randall's solution.

Closure Property

Distributive Property

Addition Property of Equality

Division Property of Equality

Symmetric Property of Equality.

Question #4:

The equation  $(6 + a)5 = 5(6 + a)$  is true for all real numbers  $a$ .

Which property does this illustrate?

- A. Associative Property of Addition
- B. Associative Property of Multiplication
- C. Commutative Property of Multiplication
- D. Distributive Property

Question #5:

Consider the equation  $3(x + 2) + 3x = 36$ .

Without solving, name all the properties that would be used to solve the equation.

6.

Adults tickets sell for \$42, while tickets for children are priced at \$30. There are 20 fewer children than adults attending the event. If the total amount of money collected is \$3,000, then the equation  $42x + 30(x - 20) = 3,000$  can be used to find the number of each ticket sold. Match the property used at each step to solve this equation.

Multiplication Property of Equality

Division Property of Equality

Addition Property of Equality

Distributive Property

Subtraction Property of Equality

Combine Like Terms

Associative Property of Equality

Commutative Property of Equality

| Statements                            | Reasons                       |
|---------------------------------------|-------------------------------|
| 1. $42x + 30(x - 20) = 3000$          | 1. <b>Given</b>               |
| 2. $42x + 30x - 600 = 3000$           | 2.                            |
| 3. $72x - 600 = 3000$                 | 3.                            |
| 4. $72x - 600 + 600 = 3000 + 600$     | 4.                            |
| 5. $72x = 3600$                       | 5. <b>Equivalent Equation</b> |
| 6. $\frac{72x}{72} = \frac{3000}{72}$ | 6.                            |
| 7. $x = 50$                           | 7. <b>Equivalent Equation</b> |

7.

A stepped out solution is shown below.

|                |                                  |
|----------------|----------------------------------|
|                | $3(3x - 1) - 3(5x - 3) = 4$      |
| <b>Step 1:</b> | $9x - 3 - 15x + 9 = 4$           |
| <b>Step 2:</b> | $9x - 15x - 3 + 9 = 4$           |
| <b>Step 3:</b> | $-6x + 6 = 4$                    |
| <b>Step 4:</b> | $-6x + 6 - 6 = 4 - 6$            |
| <b>Step 5:</b> | $-6x = -2$                       |
| <b>Step 6:</b> | $\frac{-6x}{-6} = \frac{-2}{-6}$ |
| <b>Step 7:</b> | $x = \frac{1}{3}$                |

Part A: Which property justifies Step 1?

|    |                                  |
|----|----------------------------------|
| A. | Division Property of Equality    |
| B. | Subtraction Property of Equality |
| C. | Commutative Property             |
| D. | Distributive Property            |

Part B: Which property justifies Step 2:

|    |                                  |
|----|----------------------------------|
| A. | Division Property of Equality    |
| B. | Subtraction Property of Equality |
| C. | Commutative Property             |
| D. | Distributive Property            |

8.

Justify each step in the solution to the equation:  $4(x + 1) - 2x = -6(x - 1) + 14$  using the following reasons. (Note: not all reasons will be used).

Substitution

Combining Like Terms

Distributive Property

Addition Property of Equality

Given

Division Property of Equality

Subtraction Property of Equality

Reflexive Property

| Statements                       | Reasons |
|----------------------------------|---------|
| $4(x + 1) - 2x = -6(x - 1) + 14$ |         |
| $4x + 4 - 2x = -6x + 6 + 14$     |         |
| $2x + 4 = -6x + 20$              |         |
| $8x + 4 = 20$                    |         |
| $8x = 16$                        |         |
| $x = 2$                          |         |

9.

Brandon is solving a quadratic equation. His first step is shown below.

$$\text{Problem: } 3x^2 - 8 - 10x = 3(2x + 3)$$

$$\text{Step 1: } 3x^2 - 10x - 8 = 6x + 9$$

Which two properties did Brandon use to get to step 1?

*I. addition property of equality*

*II. commutative property of addition*

*III. multiplication property of equality*

*IV. distributive property*

A. *I and III*

B. *I and IV*

C. *II and III*

D. *II and IV*