## **A.REI.A.1: Identifying Properties 1**

- 1 A teacher asked the class to solve the equation 3(x+2) = 21. Robert wrote 3x + 6 = 21 as his first step. Which property did he use?
  - 1) associative property

3) distributive property

2) commutative property

- 4) zero property of addition
- 2 While solving the equation 4(x+2) = 28, Becca wrote 4x + 8 = 28. Which property did she use?
  - 1) distributive

3) commutative

2) associative

- 4) identity
- 3 When solving the equation  $4x^2 16 = 0$ , Laura wrote  $4x^2 = 16$  as her first step. Which property justifies Laura's first step?
  - 1) distributive property of multiplication over addition
- 3) commutative property of addition
- 2) multiplication property of equality
- 4) addition property of equality
- 4 When solving  $p^2 + 5 = 8p 7$ , Kate wrote  $p^2 + 12 = 8p$ . The property she used is
  - 1) the associative property
- 3) the distributive property
- 2) the commutative property
- 4) the addition property of equality
- 5 When solving the equation  $4(3x^2 + 2) 9 = 8x^2 + 7$ , Emily wrote  $4(3x^2 + 2) = 8x^2 + 16$  as her first step. Which property justifies Emily's first step?
  - 1) addition property of equality
- 3) multiplication property of equality
- 2) commutative property of addition
- 4) distributive property of multiplication over addition
- 6 A part of Jennifer's work to solve the equation  $2(6x^2 3) = 11x^2 x$  is shown below.

Given: 
$$2(6x^2 - 3) = 11x^2 - x$$

Step 1: 
$$12x^2 - 6 = 11x^2 - x$$

Which property justifies her first step?

- 1) identity property of multiplication
- 3) commutative property of multiplication
- 2) multiplication property of equality
- 4) distributive property of multiplication over subtraction
- 7 When solving the equation  $12x^2 7x = 6 2(x^2 1)$ , Evan wrote  $12x^2 7x = 6 2x^2 + 2$  as his first step. Which property justifies this step?
  - 1) subtraction property of equality
- 3) associative property of multiplication
- 2) multiplication property of equality
- 4) distributive property of multiplication over subtraction
- 8 When solving for the value of x in the equation 4(x-1) + 3 = 18, Aaron wrote the following lines on the board.

[line 1] 
$$4(x-1)+3=18$$

[line 2] 
$$4(x-1) = 15$$

[line 3] 
$$4x - 1 = 15$$

[line 4] 
$$4x = 16$$

$$\begin{bmatrix} \text{line 5} \end{bmatrix} \qquad \qquad x = 4$$

Which property was used *incorrectly* when going from line 2 to line 3?

1) distributive

3) associative

2) commutative

4) multiplicative inverse

9 Britney is solving a quadratic equation. Her first step is shown below.

Problem: 
$$3x^2 - 8 - 10x = 3(2x + 3)$$

Step 1: 
$$3x^2 - 10x - 8 = 6x + 9$$

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

- I. addition property of equality
- II. commutative property of addition
- III. multiplication property of equality
- IV. distributive property of multiplication over addition
- 1) I and III

3) II and III

2) I and IV

- 4) II and IV
- 10 In the process of solving the equation  $10x^2 12x 16x = 6$ , George wrote  $2(5x^2 14x) = 2(3)$ , followed by
  - $5x^2 14x = 3$ . Which properties justify George's process?
    - A. addition property of equality
    - B. division property of equality
    - C. commutative property of addition
    - D. distributive property
  - 1) *A* and *C*

3) *D* and *C* 

2) *A* and *B* 

- $\overrightarrow{A}$  D and B
- A method for solving 5(x-2)-2(x-5)=9 is shown below. Identify the property used to obtain each of the two indicated steps.

$$5(x-2) - 2(x-5) = 9$$

(1) 
$$5x - 10 - 2x + 10 = 9$$

(2) 
$$5x - 2x - 10 + 10 = 9$$

$$3x + 0 = 9$$

$$3x = 9$$

$$x = 3$$

John was given the equation 4(2a+3) = -3(a-1) + 31 - 11a to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$$4(2a+3) = -3(a-1) + 31 - 11a$$
 Given

$$8a + 12 = -3a + 3 + 31 - 11a$$

$$8a + 12 = 34 - 14a$$

$$22a + 12 = 34$$

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13 A student is in the process of solving an equation. The original equation and the first step are shown below.

Original: 
$$3a + 6 = 2 - 5a + 7$$

Step one: 
$$3a + 6 = 2 + 7 - 5a$$

Which property did the student use for the first step? Explain why this property is correct.

## **A.REI.A.1: Identifying Properties 1 Answer Section**

1	ANS:	3	REF:	081419ia
2	ANS:	1	REF:	080601a
3	ANS:	4	REF:	082406ai
4	ANS:	4	REF:	061909ai
5	ANS:	1	REF:	061401ai
6	ANS:	4	REF:	081701ai
7	ANS:	4	REF:	011801aii
8	ANS:	1	REF:	061405ia
9	ANS:	4	REF:	011908ai
10	ANS:	4	REF:	082219ai

11 ANS:

(1) Distributive; (2) Commutative

REF: 061132ia

12 ANS:

Distributive and Addition Property of Equality

REF: 012029ai

13 ANS:

Commutative, This property is correct because x + y = y + x.

REF: 081926ai