A.REI.A.1: Identifying Properties 1a

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
2) commutative property
3) distributive 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
2) associative
3) commutative
4) identity

3 When solving $p^2+5=8p-7$, Kate wrote $p^2+12=8p$. The property she used is
1) the associative property
2) the commutative property
3) the distributive property
4) the addition property of equality

4 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
2) commutative property of addition
3) multiplication property of equality
4) distributive property of multiplication over addition

5 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
2) multiplication property of equality
3) commutative property of multiplication
4) distributive property of multiplication over subtraction

6 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
2) multiplication property of equality
3) associative property of multiplication
4) distributive property of multiplication over subtraction

7 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] $4x=16$
[line 5] $x=4$

Which property was used *incorrectly* when going from line 2 to line 3?
1) distributive
2) commutative
3) associative
4) multiplicative inverse

8 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
2) I and IV
3) II and III
4) II and IV

9 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*
2) *A* and *B*
3) *D* and *C*
4) *D* and *B*

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

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

$3x + 0 = 9$

$3x = 9$

$x = 3$

11 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

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

$8a + 12 = 34 - 14a$ Combining like terms

$22a + 12 = 34$ _____

12 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.

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Answer Section

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

REF: 061132ia
11 ANS:
Distributive and Addition Property of Equality

REF: 012029ai
12 ANS:
Commutative, This property is correct because $x + y = y + x$.

REF: 081926ai