

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

- 7 Stephanie is solving the equation $x^2 - 12 = 7x - 8$. Her first step is shown below.

Given: $x^2 - 12 = 7x - 8$

Step 1: $x^2 - 4 = 7x$

Which property justifies her first step?

- | | |
|-------------------------|----------------------------------|
| 1) associative property | 3) distributive property |
| 2) commutative property | 4) addition property of equality |

- 8 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 |

- 9 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 | 3) associative |
| 2) commutative | 4) multiplicative inverse |

- 10 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 |

- 11 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

- 4) D and B

- 12 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.

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

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

$$(2) \quad 5x - 2x - 10 + 10 = 9 \quad (2) \quad \underline{\hspace{2cm}}$$

$$3x + 0 = 9$$

$$3x = 9$$

$x = 3$

- 13 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.

$$4(2a + 3) = -3(a - 1) + 31 - 11a \quad \text{Given}$$

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

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

$$22a + 12 = 34$$

- 14 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: 082406ai
4 ANS: 4 REF: 061909ai
5 ANS: 1 REF: 061401ai
6 ANS: 4 REF: 081701ai
7 ANS: 4 REF: 012514ai
8 ANS: 4 REF: 011801aii
9 ANS: 1 REF: 061405ia
10 ANS: 4 REF: 011908ai
11 ANS: 4 REF: 082219ai

12 ANS:
(1) Distributive; (2) Commutative

REF: 061132ia

- 13 ANS:
Distributive and Addition Property of Equality

REF: 012029ai

- 14 ANS:
Commutative, This property is correct because $x + y = y + x$.

REF: 081926ai