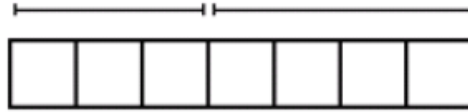


Warm Up: Lesson 7: Commutative & Associative Properties**Exercise 1**

Suzy draws the following picture to represent the sum $3 + 4$:



Ben looks at this picture from the opposite side of the table and says, "You drew $4 + 3$."

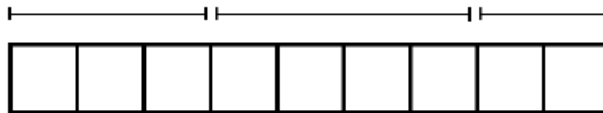
Explain why Ben might interpret the picture this way.

This is an example of the Commutative Property of Addition $a + b = b + a$

List 2 other examples: _____

Exercise 2

Suzy adds more to her picture and says, "the picture now represents $(3 + 4) + 2$."



How might Ben interpret this picture? Explain your reasoning.

This is an example of the Associative Property of Addition $(a + b) + c = a + (b + c)$

List 2 other examples: _____

Exercise 3

Suzy then draws another picture of squares to represent the product 3×4 . Ben moves to the end of the table and says, "From my new seat, your picture looks like the product 4×3 ."

What picture might Suzy have drawn? Why would Ben see it differently from his viewpoint?

This is an example of the Commutative Property of Multiplication $a \times b = b \times a$

List 2 other examples: _____

Exercise 4

Draw a picture to represent the quantity $(3 \times 4) \times 5$ that also could represent the quantity $(4 \times 5) \times 3$ when seen from a different viewpoint.

This is an example of the Associative Property of Multiplication $(ab)c = a(bc)$

List 2 other examples: _____

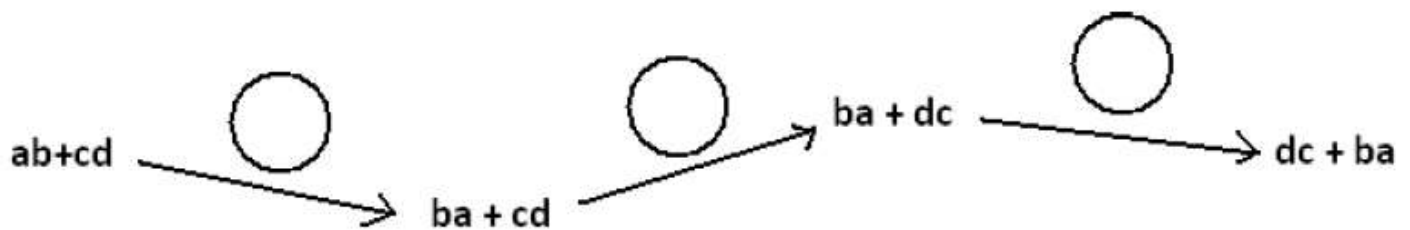
Identify which property is shown by each of the examples below:

- 1.) $(x + y) + z \rightarrow x + (y + z)$ _____
- 2.) $(x + y) + z \rightarrow z + (x + y)$ _____
- 3.) $(x + y) + z \rightarrow (y + x) + z$ _____
- 4.) $(xy)z \rightarrow z(xy)$ _____
- 5.) $(xy)z \rightarrow (yx)z$ _____
- 6.) $(xy)z \rightarrow x(yz)$ _____
- 7.) $x(y + z) \rightarrow xy + xz$ _____

Apply the property to the example below:

- 8.) $(pq)r \rightarrow$ _____ Associative Property of Multiplication
- 9.) $(pq)r \rightarrow$ _____ Commutative Property of Multiplication
- 10.) $(pq)r \rightarrow$ _____ Commutative Property of Multiplication
- 11.) $ab + cd \rightarrow$ _____ Commutative Property of Multiplication
- 12.) $ab + cd \rightarrow$ _____ Commutative Property of Addition
- 13.) $w(w + 5) \rightarrow$ _____ Commutative Property of Addition
- 14.) $(w + w) + 5 \rightarrow$ _____ Associative Property of Addition

The following portion of a flow diagram shows that the expression $ab + cd$ is equivalent to the expression $dc + ba$.



Fill in each circle with the appropriate symbol: Either C_+ (for the "Commutative Property of Addition") or C_\times (for the "Commutative Property of Multiplication").

Name _____

Date _____

Lesson 7 - Commutative & Associative Properties

Classwork/Homework

- 1 Which property is illustrated by the equation $ax + ay = a(x + y)$?
 - a) associative
 - b) commutative
 - c) distributive
 - d) identity

- 2 The equation $3(4x) = (4x)3$ illustrates which property of multiplication?
 - a) commutative
 - b) associative
 - c) distributive
 - d) multiplicative inverse

- 3 If M and A represent integers, $M + A = A + M$ is an example of which property of addition?
 - a) commutative
 - b) associative
 - c) distributive
 - d) closure

- 4 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) _____

$$3x + 0 = 9$$

$$3x = 9$$

$$x = 3$$