Name: _____ Date: _____

Unit 1 **Lesson 7**

Do Now: Determine whether each statement is *true* or *false*

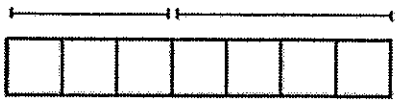
a) $2+1=1+2$ $3 = 3$ true

b) $2-1=1-2$ $1 = -1$ False

AIM: Properties

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.

Ben read the picture from RIGHT → LEFT



What property was illustrated above? Commutative Property of Addition

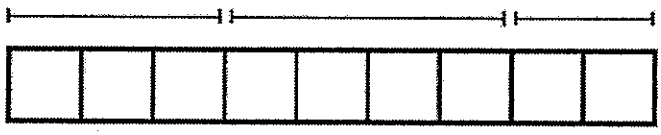
$$a + b = b + a$$

Does this property work for any other operation? Commutative Property of Multiplication

$$a \cdot b = a \cdot b$$

2. Suzy adds more to her picture and says, "the picture now represents $(3+4)+2$. Ben interprets this picture as $3+(4+2)$." Is he correct? Explain.

Yes, order does not matter with addition



What property was illustrated above? Associative Property of Addition

$$a + (b + c) = (a + b) + c$$

Does this property work for any other operation? Associative Property of Multiplication

$$a \cdot (b \cdot c) = (a \cdot b) \cdot c$$

For #3-6, determine which property makes the following two expressions equivalent. You can just label them with a **C** for Commutative Property and an **A** for Associative Property.

3.	4.	5.	6.
$2\frac{1}{2}+\frac{13}{9}$ $\quad$ $\frac{13}{9}+2\frac{1}{2}$ C	$(-3)\times\frac{1}{\sqrt{7}}$ $\quad$ $\frac{1}{\sqrt{7}}\times(-3)$ C	$x+(a+3)$ $\quad$ $(x+a)+3$ A	$5(3x)$ $\quad$ $(5\times3)x$ A

7. Given the expression $(a+b)+c$ write an equivalent expression using the commutative property.

$c+(a+b)$

8. Given the expression $(x+y)+z$ write an equivalent expression using the associative property.

$x+(y+z)$

9. Which property of real numbers is illustrated by the equation $52+(27+36)=(52+27)+36$?
   1) commutative property
   2) associative property
   3) distributive property
   4) identity property of addition

For #10-13, identify the property being illustrated using the following abbreviations

A = Associate property
C = Commutative Property
D = Distributive
CLT = Combine Like Terms

10.

$2(3x-4)-7x=$ Given Statement
$6x+(-8)+(-7x)=$ Distributive
$6x+(-7x)+(-8)=$ Commutative
$-x-8$ CLT

11.

	$23+5x+7y-x-y-27$	Given Statement
1)	$23-27+5x-x+7y-y$	Commutative
2)	$(23-27)+(5x-x)+(7y-y)$	Associative
3)	$-4+4x+6y$	CLT

12.

	$3(x+2)-4x$	Given Statement
1)	$3x+6-4x$	Distributive
2)	$3x-4x+6$	Comm
3)	$-x+6$	CLT

13. State the properties being used in the mathematical proof of the algebraic equivalency of $(ab)^2$ and a^2b^2.

$(ab)^2=(ab)(ab)$	Given Statement
$=a(ba)b$	Associative
$=a(ab)b$	Commutative
$=(aa)(bb)$	Associative
$=a^2b^2$	CLT

14.

Which property is illustrated by the equation $ax + ay = a(x + y)$?

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

15.

The equation $3(4x) = (4x)3$ illustrates which property?

1) commutative
2) associative
3) distributive
4) multiplicative inverse

16.

Which property is illustrated by the equation $6 + (4 + x) = 6 + (x + 4)$?

1) associative property of addition
2) associative property of multiplication
3) distributive property
4) commutative property of addition

17.

Tori computes the value of $8 \cdot 95$ in her head by thinking $8(100 - 5) = 8 \times 100 - 8 \times 5$. Which number property is she using?

1) associative
2) distributive
3) commutative
4) closure

18.

Which equation is an example of the use of the associative property of addition?

1) $x + 7 = 7 + x$
2) $3(x + y) = 3x + 3y$
3) $(x + y) + 3 = x + (y + 3)$
4) $3 + (x + y) = (x + y) + 3$

19.

What property of addition states that the order in which two real numbers are added does not affect the sum?

Commutative