6-5 Algebra: Properties

Vocab

Equivalent expression – expressions that have the same value

Key Concept — Use Properties to Compare Expressions

Commutative Properties — The order in which two numbers are added or multiplied does not change their sum or product.

$7 + 9 = 9 + 7$ $\qquad$ $4 \cdot 6 = 6 \cdot 4$

$a + b = b + a$ $\qquad$ $a \cdot b = b \cdot a$

Associative Properties — The way in which three numbers are grouped when they are added or multiplied does not change their sum or product.

$3 + (9 + 4) = (3 + 9) = 4$ $\qquad$ $8 \cdot (5 \cdot 7) = (8 \cdot 5) \cdot 7$

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

Identity Properties — The sum of an addend and 0 is the addend. The product of a factor and 1 is the factor.

$13 + 0 = 13$ $\qquad$ $7 \cdot 1 = 7$

$a + 0 = a$ $\qquad$ $a \cdot 1 = a$

"Cheat sheet"

Property	How to tell which is which
Commutative Properties	Change the order of the numbers (flip them)
Associative Properties	Change the numbers grouped together with the parentheses
Identity Properties	A number is added to 0 or a number is multiplied by 1

Examples:

Determine if the two expressions are equivalent. If so, tell what property is applied. If not, explain why.

$7 \cdot (3 \cdot 2)$ and $(7 \cdot 3) \cdot 2$

$7 \cdot 6$ $21 \cdot 2$

42 42

yes

Associative

$16 + 0$ and 16

16 16

yes

identity

$32 + 4$ and $4 + 32$

36 36

yes

Commutative

$40 \div (8 \div 2)$ and $(40 \div 8) \div 2$

$40 \div 4$ $5 \div 2$

10 2.5

No

one is 10 and the other is 2.5

Use one or more properties to rewrite each expression as an expression that does not use parentheses.

$(b + 4) + 17$

$b + 21$

$7 \cdot (y \cdot 3)$

$21 \cdot y$ or $21y$

$6 + (x + 50)$

$56 + x$

$(p \cdot 1) \cdot 6$

$6 \cdot p$ or $6p$