Algebra 1 10/20

Warm Up IXL Algebra 1 A.5

1-3 Properties of Numbers

I can recognize the properties of numbers including equality, identity, commutative and associative

Equivalent Expressions

two expressions that equal the same value such as 2k+6k and 8k

KeyConcept Properties of Equality

Property	Words	Symbols	Examples
Reflexive Property	Any quantity is equal to itself.	For any number a, $a = a$.	$5 = 5$ $4 + 7 = 4 + 7$
Symmetric Property	If one quantity equals a second quantity, then the second quantity equals the first.	For any numbers a and b, if $a = b$, then $b = a$.	If $8 = 2 + 6$, then $2 + 6 = 8$.
Transitive Property	If one quantity equals a second quantity and the second quantity equals a third quantity, then the first quantity equals the third quantity.	For any numbers a, b, and c, if $a = b$ and $b = c$, then $a = c$.	If $6 + 9 = 3 + 12$ and $3 + 12 = 15$, then $6 + 9 = 15$.
Substitution Property	A quantity may be substituted for its equal in any expression.	If $a = b$, then a may be replaced by b in any expression.	If $n = 11$, then $4n = 4 \cdot 11$

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KeyConcept Addition Properties

Property	Words	Symbols	Examples
Additive Identity	For any number a, the sum of a and 0 is a.	$a + 0 = 0 + a = a$	$2 + 0 = 2$ $0 + 2 = 2$
Additive Inverse	A number and its opposite are additive inverses of each other.	$a + (-a) = 0$	$3 + (-3) = 0$ $4 - 4 = 0$

KeyConcept Multiplication Properties

Property	Words	Symbols	Examples
Multiplicative Identity	For any number a, the product of a and 1 is a.	$a \cdot 1 = a$ $1 \cdot a = a$	$14 \cdot 1 = 14$ $1 \cdot 14 = 14$
Multiplicative Property of Zero	For any number a, the product of a and 0 is 0.	$a \cdot 0 = 0$ $0 \cdot a = 0$	$9 \cdot 0 = 0$ $0 \cdot 9 = 0$
Multiplicative Inverse	For every number $\frac{a}{b}$, where $a, b \neq 0$, there is exactly one number $\frac{b}{a}$ such that the product of $\frac{a}{b}$ and $\frac{b}{a}$ is 1.	$\frac{a}{b} \cdot \frac{b}{a} = 1$ $\frac{b}{a} \cdot \frac{a}{b} = 1$	$\frac{4}{5} \cdot \frac{5}{4} = \frac{20}{20}$ or 1 $\frac{5}{4} \cdot \frac{4}{5} = \frac{20}{20}$ or 1

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Ex. 1 Evaluate $7(4-3)-1+5\left(\frac{1}{5}\right)$ Name the property used in each step.

$7(4-3)-1+5\left(\frac{1}{5}\right)$

$7(1)-1+5\left(\frac{1}{5}\right)$ Substitution

$7-1+1$ Substitution

$6+1$ Subtraction

7 Addition

$\frac{5}{1}\cdot\frac{1}{5}=\frac{5}{5}$

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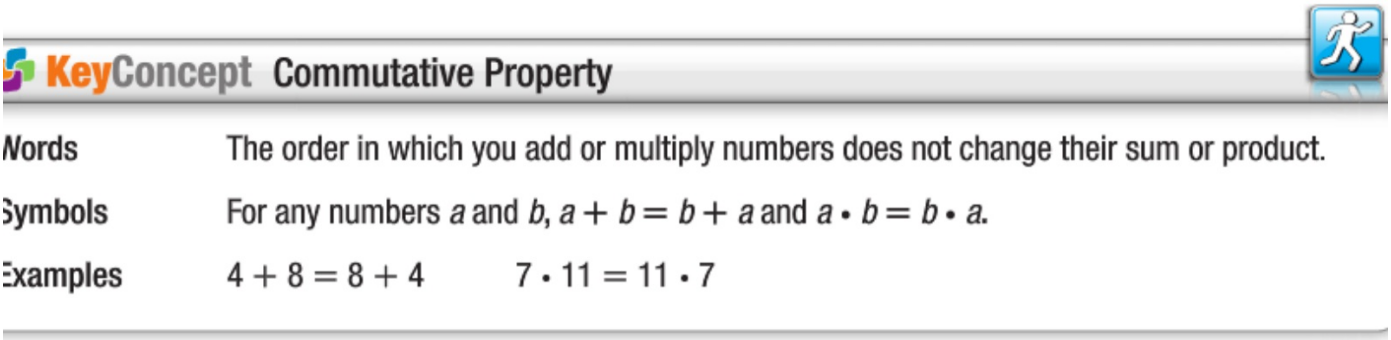
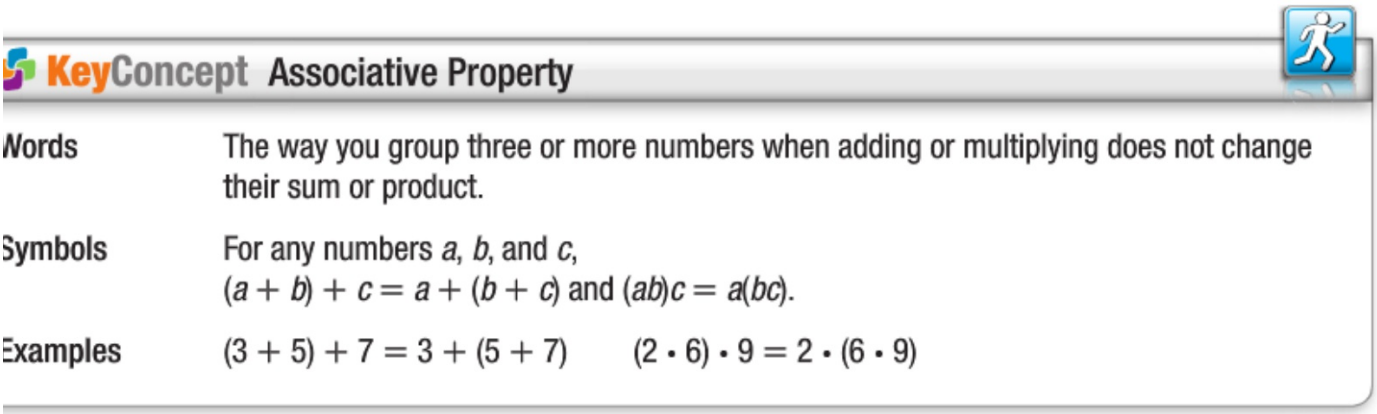


KeyConcept Commutative Property

Words	The order in which you add or multiply numbers does not change their sum or product.
Symbols	For any numbers a and b, $a + b = b + a$ and $a \cdot b = b \cdot a$.
Examples	$4 + 8 = 8 + 4$ $\quad 7 \cdot 11 = 11 \cdot 7$



KeyConcept Associative Property

Words	The way you group three or more numbers when adding or multiplying does not change their sum or product.
Symbols	For any numbers a, b, and c, $(a + b) + c = a + (b + c)$ and $(ab)c = a(bc)$.
Examples	$(3 + 5) + 7 = 3 + (5 + 7)$ $\quad (2 \cdot 6) \cdot 9 = 2 \cdot (6 \cdot 9)$

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Ex. 2 Eric makes a list of items that he needs to buy for a party and their costs. Find the total cost of these items.

Party Supplies	
Item	Cost ($)
balloons	6.75
decorations	14.00
food	23.25
beverages	20.50

$6.75 + 14 + 23.25 + 20.50$

$6.75 + 23.25 + 14 + 20.50$

$30 + 34.5$

$64.50

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Ex. 3 Evaluate $5 \cdot 7 \cdot 4 \cdot 2$ state the property used in each step.

$5 \cdot 7 \cdot 4 \cdot 2$

$5 \cdot 4 \cdot 7 \cdot 2$ commutative

$(5 \cdot 4) \cdot (7 \cdot 2)$ Associative

$20 \cdot 14$ multiplication or Substitution

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Hmwk IXL Algebra 1 H.1