Rules of Math

Key Concept

Properties of Operations

Watch

Words The **Commutative Property** states that the order in which numbers are added or multiplied does not change the sum or product.

THE ORDER DOES NOT MATTER

	Addition	Multiplication
Symbols	$a + b = b + a$	$a \cdot b = b \cdot a$
Examples	$6 + 1 = 1 + 6$	$7 \cdot 3 = 3 \cdot 7$

Words The **Associative Property** states that the way in which numbers are grouped when they are added or multiplied does not change the sum or product.

THE GROUPING DOES NOT MATTER

	Addition	Multiplication
Symbols	$a + (b + c) = (a + b) + c$	$a \cdot (b \cdot c) = (a \cdot b) \cdot c$
Examples	$2 + (3 + 8) = (2 + 3) + 8$	$3 \cdot (4 \cdot 5) = (3 \cdot 4) \cdot 5$

A **property** is a statement that is true for any number. The following properties are also true for any numbers.

Property	Words	Symbols	Examples
Additive Identity	When 0 is added to any number, the sum is the number.	$a + 0 = a$ $0 + a = a$	$9 + 0 = 9$ $0 + 9 = 9$
Multiplicative Identity	When any number is multiplied by 1, the product is the number.	$a \cdot 1 = a$ $1 \cdot a = a$	$5 \cdot 1 = 5$ $1 \cdot 5 = 5$
Multiplicative Property of Zero	When any number is multiplied by 0, the product is 0.	$a \cdot 0 = 0$ $0 \cdot a = 0$	$8 \cdot 0 = 0$ $0 \cdot 8 = 0$

Example

Tutor

1. **Name the property shown by the statement $2 \cdot (5 \cdot n) = (2 \cdot 5) \cdot n$.**

The order of the numbers and variable did not change, but their grouping did. This is the Associative Property of Multiplication.

Got It? **Do these problems to find out.**

a. $42 + x + y = 42 + y + x$ b. $3x + 0 = 3x$

Work Zone

$2 \cdot 3 \cdot 4 = 24$
$3 \cdot 4 \cdot 2 = 24$

$2 \cdot 19 \cdot 5 = 190$
$2 \cdot 5 \cdot 19 = 190$

$59 + 113 + 41 =$
$59 + 41 + 113 = 213$

$\frac{3}{4} \cdot \frac{5}{5} = \frac{15}{20}$

$1 + (2 + 3) =$
$1 + 5 = 6$

$(1 + 2) + 3$
$3 + 3 = 6$

$130 + (70 + 95) =$
$(130 + 70) + 95 =$
$200 + 95 = 295$

$4 \cdot (5 \cdot 13) =$
$(4 \cdot 5) \cdot 13 = 260$

$-11 + 23 + 11 =$
$-11 + 11 + 23$
$0 + 23 = 23$

$17(2.5)(-\frac{1}{3})(0)(475)(-0.02) = 0(17)(2.5)(-\frac{1}{3})(475)(-0.02) = 0$

Show your work.

a. _____

b. _____