

PROPERTIES OF MULTIPLICATION AND ADDITION

Key Term/ Concept	Definition / Type of Change	Example
The Commutative Property of Addition	<p>The ORDER in which you add numbers <u>does not</u> change the sum.</p> $a + b = b + a$ <p>(type of change) <u>reorder the terms</u></p>	$5 + 2 = 2 + 5 = 7$ $6 + 13 + 4 = 6 + 4 + 13 = 23$ $10 + 13$ $x + 3 = 3 + x$
The Commutative Property of Multiplication	<p>The ORDER in which you multiply numbers <u>does not</u> change the product.</p> $a \cdot b = b \cdot a$ <p>(type of change) <u>reorder the terms</u></p>	$4 \cdot 5 = 5 \cdot 4 = 20$ $2 \cdot 13 \cdot 5 = 2 \cdot 5 \cdot 13 = 130$ $10 \cdot 13$ $x \cdot 3 = 3 \cdot x = 3x$
The Associative Property of Addition	<p>The way you GROUP numbers being added <u>does not</u> change the sum.</p> $(a + b) + c = a + (b + c)$ <p>(type of change) <u>regroup the terms - move the ()</u></p>	$(23 + 15) + 5 = 23 + (15 + 5) = 43$ $23 + 20$ $(x + 2) + 3 = x + (2 + 3) = x + 5$ $x + 5$
The Associative Property of Multiplication	<p>The way you GROUP numbers in a multiplication problem <u>does not</u> change the product.</p> $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ <p>(type of change) <u>regroup the terms - move the ()</u></p>	$(3 \cdot 4) \cdot 5 = 3 \cdot (4 \cdot 5) = 60$ $3 \cdot 20$ $(x \cdot 3) \cdot 4 = x \cdot (3 \cdot 4) = x \cdot 12 = 12x$

* Properties allow you to break the order of operations

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Additive Identity Property	<p>Adding zero to any number <u>does not</u> change the number.</p> $a + 0 = a$ <p>(type of change) <u>No Change</u></p>	$5 + 0 = 5$
Multiplicative Identity Property	<p>Multiplying a number by one will result in the original number.</p> $a \cdot 1 = a$ <p>(type of change) <u>no change</u></p>	$4 \cdot 1 = 4$
Additive Inverse Property	<p>What you add to a number to create the sum of zero.</p> $a + (-a) = 0$ <p><u>additive inverses</u> (opposites)</p>	$3 + (-3) = 0$
Multiplicative Inverse Property	<p>A number times its multiplicative inverse has a product of 1.</p> $a \cdot \frac{1}{a} = 1 \quad \text{where } a \neq 0$ <p><u>Reciprocals</u></p>	$2 \cdot \frac{1}{2} = 1$
Zero Product Property	<p>The product of any number and zero is zero.</p> $a \cdot 0 = 0$	$6 \cdot 0 = 0$