

# PROPERTIES OF REAL NUMBERS

In math, properties are statements that are true for any numbers.  
They justify steps when simplifying expressions and solving equations.

<b>COMMUTATIVE</b> <i>Property</i>	<b>Main Idea:</b> Order does not matter with addition and multiplication	
	<b>ADDITION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>a + b = b + a</math></li> <li>• <math>7 + 5 = 5 + 7</math></li> <li>• <math>3x + 8 = 8 + 3x</math></li> <li>• <math>y + 9x = 9x + y</math></li> </ul>	<b>MULTIPLICATION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>a \cdot b = b \cdot a</math></li> <li>• <math>ab \cdot 7 = 7 \cdot ab</math></li> <li>• <math>-5y \cdot 4 = 4 \cdot -5y</math></li> <li>• <math>(x + y) \cdot 3 = 3 \cdot (x + y)</math></li> </ul>

<b>ASSOCIATIVE</b> <i>Property</i>	<b>Main Idea:</b> Grouping doesn't matter with addition and multiplication	
	<b>ADDITION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>(8 + 9) + 7 = 8 + (9 + 7)</math></li> <li>• <math>(x + y) + z = x + (y + z)</math></li> <li>• <math>7a + (2 + y) = (7a + 2) + y</math></li> <li>• <math>6 + (3a + 1) = (6 + 3a) + 1</math></li> </ul>	<b>MULTIPLICATION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>a \cdot (b \cdot c) = (a \cdot b) \cdot c</math></li> <li>• <math>7 \cdot (2 \cdot 1) = (7 \cdot 2) \cdot 1</math></li> <li>• <math>6x \cdot (2y \cdot 3) = (6x \cdot 2y) \cdot 3</math></li> <li>• <math>4a \cdot (3b \cdot 5c) = (4a \cdot 3b) \cdot 5c</math></li> </ul>

<b>IDENTITY</b> <i>Property</i>	<b>Main Idea:</b> Keep the value of the number	
	<b>ADDITION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>a + 0 = a</math></li> <li>• <math>x + 0 = x</math></li> <li>• <math>4a + 0 = 4a</math></li> <li>• <math>-7g + 0 = -7g</math></li> </ul>	<b>MULTIPLICATION EXAMPLES</b> <ul style="list-style-type: none"> <li>• <math>7 \cdot 1 = 7</math></li> <li>• <math>\frac{1}{4} \cdot 1 = \frac{1}{4}</math></li> <li>• <math>6x \cdot 1 = 6x</math></li> <li>• <math>-3b \cdot 1 = -3b</math></li> </ul>

<b>INVERSE</b> Property	<b>Main Idea:</b> Uses the opposite to 'cancel' out.	
	<b>ADDITION EXAMPLES</b>	<b>MULTIPLICATION EXAMPLES</b>
	<ul style="list-style-type: none"> <li><math>10 + (-10) = 0</math></li> <li><math>\frac{1}{2} + (-\frac{1}{2}) = 0</math></li> <li><math>-7 + 7 = 0</math></li> <li><math>x + (-x) = 0</math></li> </ul>	<ul style="list-style-type: none"> <li><math>10 \cdot \frac{1}{10} = 1</math></li> <li><math>-\frac{1}{3} \cdot -3 = 1</math></li> <li><math>b \cdot \frac{1}{b} = 1</math></li> <li><math>\frac{5}{4} \cdot \frac{4}{5} = 1</math></li> </ul>

<b>PROPERTY OF ZERO</b>	<b>Main Idea:</b> Anything multiplied by zero equals zero	
	<b>EXAMPLES</b>	
	$5x \cdot 0 = 0$	$(x+7y) \cdot 0 = 0$

<b>DISTRIBUTIVE</b> Property	<b>Main Idea:</b> Multiplying a value to an expression in parenthesis	
	<b>EXAMPLES</b>	
	$5(x-2) = 5x-10$	$a(b+c) = ab+ac$
	$\frac{1}{2}(20x-4) = 10x-2$	$-7(x-y) = -7x+7y$

Name That Property!	
1. $4+(a+b) = (4+a)+b$	Associative Prop of Add.
2. $2(x+9) = 2x+2 \cdot 9$	Distributive
3. $(2x) \cdot 1 = 2x$	Identity (Multiplicative)
4. $(m+n)+3 = (n+m)+3$	Commutative Prop. of Add.
5. $(5-k) \cdot 0 = 0$	Zero Property
6. $7(w+3) = (w+3)7$	Commutative of Multiplication
7. Name the additive inverse of 16.	-16
8. Name the multiplicative inverse of $\frac{3}{7}$ .	$\frac{7}{3}$

$$\begin{array}{l} \overbrace{2(3+4)} \\ 2(7) \\ 14 \end{array} = \begin{array}{l} 2(3) + 2(4) \\ 6 + 8 \\ 14 \end{array}$$

Name: \_\_\_\_\_

Unit 1: The Real Numbers

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 11: Properties of Real Numbers

<b>Directions:</b> Name the property that justifies the statement.	
1. $-9 + (4 + x) = (-9 + 4) + x$	2. $7(c + 4) = 7c + 28$
3. $-5 \cdot 3 = 3 \cdot -5$	4. $12 \cdot 1 = 12$
5. $\frac{2}{5} \cdot \frac{5}{2} = 1$	6. $\left(\frac{1}{2} \cdot \frac{4}{9}\right) \cdot \frac{2}{3} = \frac{1}{2} \cdot \left(\frac{4}{9} \cdot \frac{2}{3}\right)$
7. $14x \cdot 0 = 0$	8. $x(y + z) = xy + xz$
8. $7 \cdot (-2 \cdot 8) = 7 \cdot (8 \cdot -2)$	10. $c^2 + 0 = c^2$
11. $10 + (-10) = 0$	12. $5 \cdot (m + n) = (m + n) \cdot 5$
13. $(a + b) \cdot 1 = (a + b)$	14. $(2x - y) \cdot 0 = 0$
<b>Directions:</b> Use the given property to complete the statement.	
15. Associative Property: $(-4 \cdot 6) \cdot 3 =$ _____	16. Inverse Property: $7 \cdot$ _____ $=$ _____
17. Identity Property: $3k +$ _____ $=$ _____	18. Distributive Property: $4(x + 5) =$ _____
19. Property of Zero: $(m - n) \cdot$ _____ $=$ _____	20. Commutative Property: $12 + 9 =$ _____
20. What is the additive inverse of 8?	22. What is the multiplicative identify of $-\frac{1}{2}$ ?
22. What is the multiplicative inverse of $\frac{5}{4}$ ?	24. What is the additive identity of -17?

IXL  
properties  
7th grade  
r9, r11, r12

