

# Properties Organizer

The following properties should be review!

| PROPERTY   | Main Idea   | EXAMPLES   |
|--|---|--|
| <b>COMMUTATIVE PROPERTY</b><br><br>Addition or Multiplication              | <u>Order</u> of values<br>does not matter!                                    | $2 + 3 = 3 + 2$<br>$2 \cdot (4) = 4(2)$                      |
| <b>ASSOCIATIVE PROPERTY</b><br><br>Addition or Multiplication              | <u>Order</u> of values<br>does not matter!                                    | $(2 + 3) + 1 = 2 + (3 + 1)$<br>$2(4 \cdot 3) = (2 \cdot 4)3$ |
| <b>IDENTITY PROPERTY</b><br><br>Addition or Multiplication                 | <u>Stays the Same!</u>  | $5 + 0 = 5$<br>$5(1) = 5$                                    |
| <b>INVERSE PROPERTY</b><br><br>Addition or Multiplication                  | Using <u>the opposite</u> to<br>"cancel" a value!                             | $6 + (-6) = 0$<br>$4 \cdot (\frac{1}{4}) = 1$                |
| <b>ZERO PRODUCT PROPERTY</b>   | Multiplying by <u>0</u> always<br>equals <u>0</u> !                           | $3(0) = 0$   |
| <b>DISTRIBUTIVE PROPERTY</b><br><br>A way of simplifying<br>an expression! | <u>Multiplying</u> a<br>value to an expression inside<br><u>parentheses</u> . | $2(2x + 3) = 4x + 6$<br>$-4(4x - 6) = -16x + 24$             |

# The "Newbies!"

The following properties will be new to you.  
Flashcards are suggested to help learn these properties!

| PROPERTY            | Main Idea                           | EXAMPLES                           |
|---------------------|-------------------------------------|------------------------------------|
| REFLEXIVE PROPERTY  | For all real numbers<br>$x = x$     | $3 = 3$                            |
| SYMMETRIC PROPERTY  | $a = b$ then<br>$b = a$             | $a = 2$<br>$2 = a$                 |
| TRANSITIVE PROPERTY | $a = b$ and $b = c$<br>then $a = c$ | $5 = 2 + 3$ $2 + 3 = 5$<br>$5 = 5$ |

|                  |   |
|------------------|---|
| CLOSURE PROPERTY | <p>A set is <b>closed</b> (under an operation) if the operation always produces an element of the same set. If an element outside the set is produced, then the operation is <b>not closed</b>.</p> <p><b>Answer True/False. If false, give a counterexample.</b></p> <p><b>Ex1:</b> Integers are closed under multiplication. <u>T</u></p> <p><b>Ex2:</b> Natural numbers are closed under subtraction. <u>F</u></p> <p><b>Ex 3:</b> Even numbers are closed under addition. <u>T</u></p> <p><b>Ex 4:</b> Irrational numbers closed under division. <u>F</u></p> |
|------------------|---|