9/14/11

2-2: Properties of Numbers

Recognizing Properties

1. The Commutative Properties:
    a. You may notice that the sum of 6 and 4 is the same as the sum of 4 and 6.
    b. Similarly, the product of 9 and 5 is the same as the product of 5 and 9.
    c. These "properties" have a name.
        i. Commutative Property of Addition
            1. $6 + 4 = 4 + 6$
            2. $a + b = b + a$
        ii. Commutative Property of Multiplication
            1. $9 \cdot 5 = 5 \cdot 9$
            2. $a \cdot b = b \cdot a$
2. The Associative Properties:
    a. You may also change the groupings of values before you add or multiply them.
    b. These also have a name.
        i. Associative Property of Addition
            1. $(2+ 7) + 3 = 2 + (7 + 3)$
            2. $(a + b) + c = a + (b + c)$
        ii. Associative Property of Multiplication
            1. $(9 \cdot 4)5 = 9(4 \cdot 5)$
            2. $(ab)c = a(bc)$
3. The Identity Properties:
    a. When you add any number with 0, the sum equals the original number.
        i. **0** is called the "additive identity."
    b. When you multiply any number and 1, the product equals the original number.
        i. **1** is called the "multiplicative identity."
    c. This leads to two more properties.
        i. The Identity Property of Addition
            1. $12 + 0 = 12$
            2. $a + 0 = a$
        ii. The Identity Property of Multiplication
            1. $10 \cdot 1 = 10$
            2. $a \cdot 1 = a$

Interesting Examples:

$(81 + 6) + 9$ $(4 \cdot 9) \cdot 5$

Properties

Identity Property of Addition: $a + \mathbf{0} = a$

Identity Property of Multiplication: $a(\mathbf{1}) = a$

Commutative Property of Addition: $a + b = b + a$

Commutative Property of Multiplication: $a(b) = b(a)$

Associative Property of Addition: $(a + b) + c = a + (b + c)$

Associative Property of Multiplication: $(a \bullet b)c = a(b \bullet c)$