

9-12-17

Aim: SWBAT define and identify properties of addition and multiplication.

HW: Properties WS

Do Now: Copy HW and write your name on your handout

Commutative Property of Addition (Commutative, +)

$$a + b = b + a$$

$$3 + 5 = 5 + 3$$

Terms are switching around the addition sign.

Commutative Property of Multiplication (Commutative, •)

$$ab = ba$$

$$3 \cdot 5 = 5 \cdot 3$$

Terms are switching around the multiplication sign.

Associative Property of Addition (Associative, +)

$$a + (b + c) = (a + b) + c$$

$$3 + (5 + 7) = (3 + 5) + 7$$

Terms remain in the same order.
Terms get regrouped.

Associative Property of Multiplication (Associative, \cdot)

$$a(bc) = (ab)c$$

$$3 \cdot (5 \cdot 7) = (3 \cdot 5) \cdot 7$$

Terms remain in the same order.
Terms get regrouped.

Additive Identity Property (Identity, +)

$$a + 0 = a$$

Whenever you add zero,
you don't change the value.

Multiplicative Identity Property (Identity, •)

$$a(1) = a$$

Whenever you multiply by 1,
you don't change the value.

Additive Inverse Property (Inverse, +)*opposite*

$$-a + a = 0$$

The sum of a number and its opposite (additive inverse) is always zero.

$$-3 + 3 = 0$$

Multiplicative Inverse Property (Inverse, •)*reciprocal*

$$2\left(\frac{1}{2}\right) = 1$$

The product of a number and its reciprocal (multiplicative inverse) is always one.

Multiplicative Property of Zero (Zero, •)

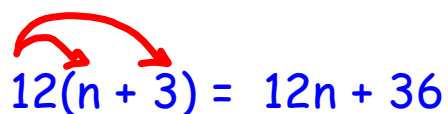
$$a \cdot 0 = 0$$

$$12 \cdot 0 = 0$$

When you multiply by zero,
the answer is zero.

Distributive Property

$$a(x + y) = ax + ay$$

A red curved arrow starts above the '12' in the equation $12(n + 3) = 12n + 36$ and points to the 'n'. A second red curved arrow starts above the '12' and points to the '3'.
$$12(n + 3) = 12n + 36$$

A term multiplies to all parts of a group.

It's called **factoring** is when the distributive property is completed backwards.

$$2x + 6y = 2(x + 3y)$$

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

~~associative~~

Name the property for each of the following:

- | | |
|--|-------------------------|
| 1) $(13 + 7) + 8 = 13 + (7 + 8)$ | Associative, + |
| 2) $0 \cdot (x + 3) = 0$ | Multiplicative, 0 |
| 3) $9 \cdot 5 = 5 \cdot 9$ | Commutative, \cdot |
| 4) $(62 + 3) + 0 = (62 + 3)$ | Additive Identity |
| 5) $2(4x + 9) = 8x + 18$ | Distributive |
| * 6) $(19 + 8) + 6 = (8 + 19) + 6$ | Commutative, + |
| 7) $(2 \cdot 3) \cdot 7 = 2 \cdot (3 \cdot 7)$ | Associative, \cdot |
| 8) $56 \cdot 1 = 56$ | Multiplicative Identity |
| 9) $2x + 6y = 2(x + 3y)$ | Distributive |
| 10) $7 \cdot \frac{1}{7} = 1$ | Multiplicative Inverse |
| 11) $-6 + (3 \cdot 8) = -6 + (8 \cdot 3)$ | Commutative, \cdot |
| 12) $-15 + 15 = 0$ | Additive Inverse |

HOMEWORK - Properties & Introduction to Adding Integers

State the name of the property that is shown.

1) $(x + 9) + 1 = x + (9 + 1)$ 1) _____

2) $1 \cdot x = x$ 2) _____

3) $(2 + 3) + 5 = 2 + (3 + 5)$ 3) _____

4) $(12 + 9) + 15 = (9 + 12) + 15$ 4) _____

5) $(2 + 7) \cdot 0 = 0$ 5) _____

6) $12 \cdot (7 \cdot 15) = (12 \cdot 7) \cdot 15$ 6) _____

7) $0 + (9 + 1) = 9 + 1$ 7) _____

8) $3(4x + 9) = 12x + 27$ 8) _____

9) $r \cdot 1 = r$ 9) _____

10) $(8 \cdot 6) \cdot 9 = 8 \cdot (6 \cdot 9)$ 10) _____

11) $106 \cdot 0 = 0$ 11) _____

12) $4(a + b) = 4a + 4b$ 12) _____

13) $-y + y = 0$ 13) _____

14) $(2 + y) + 8 = 8 + (2 + y)$ 14) _____

15) $c \cdot \frac{1}{c} = 1$ 15) _____

16) $(8 \cdot 6) + 9 = (6 \cdot 8) + 9$ 16) _____