

## PROPERTIES OF REAL NUMBERS

### The commutative Property

$$3 + 7 = 7 + 3$$

$$3 \cdot 7 = 7 \cdot 3$$

The commutative Property of Addition states that if everything is being added, you can add in ANY order.

The commutative Property of Multiplication states that if everything is being multiplied, you can multiply in ANY order

### The Associative Property

$$(4 + 3) + 2 = 4 + (3 + 2)$$

$$4(3 \cdot 2) = (4 \cdot 3) \cdot 2$$

The use of these two properties can make simplifying expressions easier.

### example 1: Evaluate

$$4 - 7 + 6 - 9 - 3 + 8 - 1 + 2 + 5$$

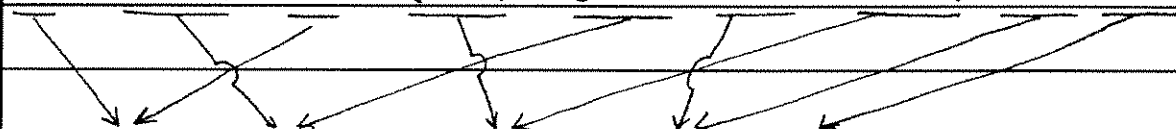
We want to rewrite this expression so that everything is being added, then we can use the commutative property of addition

$$4 + (-7) + 6 + (-9) + (-3) + 8 + (-1) + 2 + 5$$

Now that everything is being added, we can  
add in any order.

What numbers seem to "go together"?

$$4 + (-7) + 6 + (-9) + (-3) + 8 + (-1) + 2 + 5$$



$$= 10 + (-10) + (-10) + 10 + 5$$

$$= 0 + 0 + 5$$
$$= 5$$

### Identity Properties

↪

$$5 + 0 = \underline{\quad}$$

$$0 + 5 = \underline{\quad}$$

$$5 \cdot 1 = \underline{\quad}$$

$$1 \cdot 5 = \underline{\quad}$$

### Inverse Properties

↪

$$7 + (-7) = \underline{\quad}$$

$$(-7) + 7 = \underline{\quad}$$

$$\frac{3}{4} \cdot \frac{4}{3} = \underline{\quad}$$

$$-\frac{2}{7} \cdot \left(-\frac{7}{2}\right) = \underline{\quad}$$

## The Distributive Property

$$\begin{aligned}\text{example 2: } & 4(7 + x) \\ & = 4(7) + 4(x) \\ & = 28 + 4x\end{aligned}$$

$$\begin{aligned}\text{example 3: } & -6(5 - 2x) \\ \hookrightarrow & = -6( ) - (-6)( ) \\ & = ( ) - ( ) \\ & = -30 + 12x\end{aligned}$$

## PROPERTIES OF REAL NUMBERS Practice Problems

1. Evaluate  $-7 + 4 + 5 - 3 + 9 + 6 + 5$

2. Evaluate  $\frac{6}{7} \cdot \frac{7}{6}$

3.  $\left(-\frac{4}{31}\right)\left(-\frac{31}{4}\right) =$

4. What number do you multiply by  $-\frac{2}{3}$  to get 1?

5. Simplify  $-7(x - 3)$