Using the Commutative Property

- Addition: $a + b = b + a$ $3 + 5 = 5 + 3$
- Multiplication: $a \cdot b = b \cdot a$ $3(5) = 5(3)$

*** Subtraction is NOT commutative!!!***

$3 - 5 \neq 5 - 3$

Task 1: Use a commutative property to complete each statement.

a) $x + 5 =$ __5+x__   b) $3(x) =$ __x(3)__

c) $x(8) =$ __8x__   d) $x + 17 =$ __17 + x__

Task 3: Simplify each expression.

a) $10 + (x + 12)$ b) $-3(7x)$
   __x + 22__   __-21x__

c) $(5 + x) + 9$ d) $5(-6x)$
   __x + 14__   __-30x__

Using the Associative Property

- Addition: $(a + b) + c = a + (b + c)$
  $2 + (3 + 4) = (2 + 3) + 4$
- Multiplication: $(a \cdot b) \cdot c = a \cdot (b \cdot c)$
  $2 \cdot (3 \cdot 4) = (2 \cdot 3) \cdot 4$

HELPFUL HINT

Commutative property *deals with the* **ORDER** *of numbers.*

Associative property *deals with the* **GROUPING** *of numbers.*

Task 2: Use the associative property to complete each statement.

a) $5 + (4 + 6) =$ __(5+4)+6__

b) $(-1 \cdot 2) \cdot 5 =$ __-1(2·5)__

c) $(2 + 9) + 7 =$ __2 + (9+7)__

d) $-4 \cdot (2 \cdot 7) =$ __(-4·2)(7)__

Using the Distributive Property

$a(b + c) = ab + ac$ $\qquad$ $7(2 + 4) = 7(2) + 7(4)$

Task 4: Use the distributive property to write each expression without parentheses. Then simplify if possible.

a) $2(x + y)$

$2x + 2y$

b) $-5(-3 + 2z)$

$15 - 10z$

c) $5(x + 3y - z)$

$5x + 15y - 5z$

d) $-1(2 - y)$

$-2 + y$

e) $-(3 + x - w)$

$-3 - x + w$

f) $\frac{1}{2}(6x + 14) + 10$

$3x + 7 + 10 = 3x + 17$

Task 6: Use the distributive property to write each sum as a product.

a) $5(w) + 5(3)$

$5(w + 3)$

b) $9w + 9z$

$9(w + z)$

c) $8(2) + 8(x)$

$8(2 + x)$

d) $7s + 7t$

$7(s + t)$

Identities for Addition and Multiplication

- **0** is the **identity** element for **addition** because anything + 0 remains the same as it started.
- **1** is the **identity** element for **multiplication** because anything times 1 remains the same as it started.

Additive or Multiplicative Inverses

- *The numbers a & − a are **additive inverses or opposites** of each other because their **sum is 0**.*
- *The numbers b & $\frac{1}{b}$ are **reciprocals or multiplicative inverses** of each other because their **product is 1**.*

Summary

a) Distributive property
b) Opposites or additive inverses
c) Reciprocals or multiplicative inverses
d) Associative POM
e) Associative POA
f) Commutative POM
g) Commutative POA

1. $x + 5 = 5 + x$ is a true statement by the ___g___.
2. $x \cdot 5 = 5 \cdot x$ is a true statement by the ___f___.
3. $3(y + 6) = 3y + 3(6)$ is true by the ___a___.
4. $2(x \cdot y) = (2x)(y)$ is a true statement by the ___d___.
5. $x + (7 + y) = (x + 7) + y$ is a true statement by the ___e___.
6. The numbers $-\frac{2}{3}$ and $-\frac{3}{2}$ are called ___c___.
7. The numbers $-\frac{2}{3}$ and $\frac{2}{3}$ are called ___b___.

Still need help with: