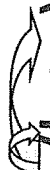


p.27 Properties

<p>For addition $a + b = b + a$</p> <p>For multiplication $ab = ba$</p>	$4 + 7 = 7 + 4$ $11 = 11$ $(-3)(5) = (5)(-3)$ $-15 = -15$
<p>For addition $(a + b) + c = a + (b + c)$</p> <p>For multiplication $(ab)(c) = a(bc)$</p>	$(4 + 1) + 6 = 4 + (1 + 6)$ $5 + 6 = 4 + 7$ $11 = 11$ $(3 \cdot 1) \cdot 4 = 3(1 \cdot 4)$ $3(4) = 3(4)$ $12 = 12$
<p> $a(b + c) = ab + ac$</p>	$9(6 + 3) = 9(6) + 9(3)$ $9(9) = 54 + 27$ $81 = 81$ $\frac{54}{27} = \frac{81}{81}$
<p>For addition $a + 0 = a$</p> <p>For multiplication $1a = a$</p>	$4 + 0 = 4$ $-12 + 0 = -12$ $-\frac{1}{4} + 0 = -\frac{1}{4}$ $1(4) = 4$ $1(-6) = -6$ $1(\frac{3}{4}) = \frac{3}{4}$
<p>0 positive</p> <p>$a + (-a) = 0$</p>	$4 + (-4) = 0$ $(-3) + 3 = 0$ $(-\frac{1}{4}) + \frac{1}{4} = 0$ $0.25 + (-0.25) = 0$
<p>$(\frac{a}{h})(\frac{b}{a}) = 1$ if $a, b \neq 0$</p>	$\frac{1}{4}(\frac{4}{1}) = \frac{4}{4} = 1$ $-\frac{3}{4}(\frac{4}{-3}) = \frac{12}{12} = 1$

Name: _____

Date: _____

Period: _____

Commutative, Associative & Distributive Properties

Change order Commutative Property of Addition	change order Commutative Property of Multiplication
<p>The order in which 2 numbers are added does not change the sum (answer).</p> $A + B = B + A$ $\underline{4 + 2 = 2 + 4}$ $\underline{6 = 6}$	<p>The order in which 2 numbers are multiplied does not change the product (answer).</p> $(A)(B) = (B)(A)$ $\underline{(4)(2) = (2)(4)}$ $\underline{8 = 8}$

Does the Commutative Property work for Subtraction or Division? NO!

Try it: $4 - 2 = 2 - 4?$
 $2 \neq -2$

$4 \div 2 = 2 \div 4?$ $\frac{2}{4} = \frac{1}{2}$
 $2 \neq \frac{1}{2}$

Same order Associative Property of Addition	Same order Associative Property of Multiplication
<p>Grouping numbers (with parentheses) differently does not change the sum (answer).</p> $(A + B) + C = A + (B + C)$ $\underline{(3 + 2) + 1 = 3 + (2 + 1)}$ $\underline{5 + 1 = 3 + 3}$ $\underline{6 = 6}$	<p>Grouping numbers (with parentheses) differently does not change the product (answer).</p> $(A \cdot B) \cdot C = A \cdot (B \cdot C)$ $\underline{(3 \cdot 2) \cdot 1 = 3 \cdot (2 \cdot 1)}$ $\underline{(6)(1) = (3)(2)}$ $\underline{6 = 6}$

Does the Associative Property work for Subtraction or Division? NO!

Try it: $(3 - 2) - 1 = 3 - (2 - 1)?$
 $1 - 1 = 3 - 1$
 $0 \neq 2$

$(8 \div 4) \div 2 = 8 \div (4 \div 2)?$
 $2 \div 2 = 8 \div 2$
 $1 \neq 4$

Distributive Property:

Multiply the number outside (touching) the parentheses by every term inside the parentheses.

$A(B + C) = A \cdot B + A \cdot C$

$$\underline{3 \cdot (2 + 4) = 3 \cdot 2 + 3 \cdot 4}$$

$$\underline{(3)(6) = 6 + 12}$$

$$\underline{18 = 18}$$

Name: _____

Date: _____

Period: _____

Identity, Inverse, Multiplication Property of Zero, & Symmetric Property
Additive Identity *Multiplicative Identity*

Identity Property of Addition	Identity Property of Multiplication
Any number plus zero always equals that number & does not change its value. $A + 0 = A$ $\underline{4} + 0 = \underline{0}$	Any number multiplied by one always equals that number & does not change its value. $(A)(1) = A$ $\underline{(4)}(1) = \underline{4}$

Inverse: Opposite
Additive Inverse *Multiplicative Inverse*

Inverse Property of Addition	Inverse Property of Multiplication
A number added to its inverse (opposite) will equal 0. $A + (-A) = 0$ $\underline{7} + \underline{(-7)} = 0$	A number multiplied by its inverse (reciprocal) will equal 1. $A \cdot \frac{1}{A} = 1$ $\underline{(2)} \cdot \frac{1}{\underline{(2)}} = 1 \quad \frac{2}{1} \cdot \frac{1}{2} = \frac{2}{2} = 1$

Multiplication Property of Zero:
Any number multiplied by zero equals zero. $A \cdot 0 = \underline{0}$ $\underline{5} \cdot 0 = \underline{0}$

Symmetric Property:
If $A = B$ then $B = A$. If $(A \cdot B) = C$ then $C = (A \cdot B)$ If $(\underline{2} \cdot \underline{3}) = \underline{6}$ then $\underline{6} = (\underline{2} \cdot \underline{3})$ If $(A + B) = (C + D)$ then $(C + D) = (A + B)$ If $(\underline{2} + \underline{3}) = (\underline{4} + \underline{1})$ then $(\underline{4} + \underline{1}) = (\underline{2} + \underline{3})$