"I Can Identify the Properties of Math that Generate Equivalent Expressions."

Commutative and Associative Properties

Two or more **Like Terms** are able to be simplified into a single term. If terms are **Unlike** then they cannot be combined.

Examples:

$4e+2e$	$d^3 \bullet d^2$	$2x+4$

Use the idea of Combining Like Terms to Simplify the following expressions

$4 \bullet 2 \bullet m \bullet m$	$b+b+b+2+7$	$8-2+7+x+x$
$3a+6a-9$	$a+5a+8-9$	$2a+4a+5b+2b$

Commutative Property

For which operations can we move around the numbers and still get the same answer?

$2+6+8$ and $8+6+2$	$12-5-2$ and $5-12-2$
$6 \bullet 4$ and $4 \bullet 6$	$8 \div 2$ and $2 \div 8$

OK but what if we use both addition and multiplication.

$2+4 \bullet 3$ and $3+2 \bullet 4$

Use the **Commutative Property** to combine like terms and simplify each expression.

1)	$3 \bullet g \bullet 4$	2)	$a+b+a+b+a$
3)	$3 \bullet 3 \bullet d \bullet 2 \bullet d \bullet d$	4)	$2a+4+6+3a$
5)	$2x+3y+2x+9+7y$	6)	$3 \bullet p \bullet p \bullet q \bullet 5 \bullet q \bullet p$

Associative Property

This property states you can change the grouping of the numbers within addition and multiplication expressions and still maintain equivalency.

$2+(6+8)$ and $(2+6)+8$	$(5 \bullet 3) \bullet 2$ and $5 \bullet (3 \bullet 2)$
Notice the Order of the Numbers doesn't change!	Notice the Order of the Numbers doesn't change!

Examples: Write an equivalent expression using the associative property.

1) $(a+b)+c$

2) $8 \bullet (7 \bullet 9)$

3) $3 \bullet (1 \bullet 8) \bullet 2$

4) $(2e+5e)+7e$

"I Can Identify the Properties of Math that Generate Equivalent Expressions."

Commutative and Associative Properties

Two or more **Like Terms** are able to be simplified into a single term. If terms are **Unlike** then they cannot be combined.

Examples:

$4e+2e$ $e+e+e+e+e+e$ $6e$	$d^3 \bullet d^2$ $d \cdot d \cdot d \cdot d \cdot d$ d^5	$2x+4$ CAN'T COMBINE $x+x+4$ $2x+4$

Use the idea of Combining Like Terms to Simplify the following expressions

$4 \bullet 2 \bullet m \bullet m$ $8 \cdot m^2$	$b+b+b+2+7$ $3b+9$	$8-2+7+x+x$ $13+2x$
$3a+6a-9$ $9a-9$	$a+5a+8-9$ $6a-1$	$2a+4a+5b+2b$ $6a+7b$

Commutative Property

For which operations can we move around the numbers and still get the same answer?

X $2+6+8$ and $8+6+2$ $8+8$ $14+2$ 16 16	$12-5-2$ and $5-12-2$ $7-2$ $-7-2$ 5 -9
X $6 \bullet 4$ and $4 \bullet 6$ 24 24	$8 \div 2$ and $2 \div 8$ 4 $\frac{1}{4}$

OK but what if we use both addition and multiplication.

$2+4 \bullet 3$ and $3+2 \bullet 4$ $2+12$ $3+8$ 14 11

Use the **Commutative Property** to combine like terms and simplify each expression.

1)	$3 \bullet g \bullet 4$ $3 \cdot 4 \cdot g$ $12 \cdot g$	2)	$a+b+a+b+a$ $a+a+a+b+b$ $3a+2b$
3)	$3 \bullet 3 \bullet d \bullet 2 \bullet d \bullet d$ $3 \cdot 3 \cdot 2 \cdot d \cdot d \cdot d$ $18 \cdot d^3$	4)	$2a+4+6+3a$ $2a+3a+4+6$ $5a+10$
5)	$2x+3y+2x+9+7y$ $2x+2x+3y+7y+9$ $4x+10y+9$	6)	$3 \bullet p \bullet p \bullet q \bullet 5 \bullet q \bullet p$ $3 \cdot 5 \cdot p \cdot p \cdot p \cdot q \cdot q$ $15 \cdot p^3 \cdot q^2$

Associative Property

This property states you can change the grouping of the numbers within addition and multiplication expressions and still maintain equivalency.

$2+(6+8)$ and $(2+6)+8$ $2+14$ $\quad$ $8+8$ 16 $\quad$ 16 Notice the Order of the Numbers doesn't change!	$(5 \bullet 3) \bullet 2$ and $5 \bullet (3 \bullet 2)$ $15 \cdot 2$ $\quad$ $5 \cdot 6$ 30 $\quad$ 30 Notice the Order of the Numbers doesn't change!

Examples: Write an equivalent expression using the associative property.

1) $(a+b)+c$

$a+(b+c)$

2) $8 \bullet (7 \bullet 9)$

$(8 \cdot 7) \cdot 9$

3) $3 \bullet (1 \bullet 8) \bullet 2$

$(3 \cdot 1) \cdot 8 \cdot 2$

4) $(2e+5e)+7e$

$2e+(5e+7e)$