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Learning Objective: We will simplify algebraic expressions. (Alg1M1L1)

Concept Development:

Like Terms are terms that have the same variable raised to the same power

Example: $2x, 23x, \text{and } x$ $(\sqrt{x})^4, x^2, x^{\frac{1}{2}}$ $x^{16}, 4x^{16}, 16x^{16}$

Non-Example: $2x^2, x, \text{and } 3x^3$ $x, 2x, 3x$ x^{10}, x^9, x^{3456} x^{10}, y^{10}, z^{10}

Associative Property: This property applies to addition and multiplication. It allows you to place terms separated by addition (or multiplication) in any **grouping**.

Examples:

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

$97 + (3 + 29) = (97 + 3) + 29$

$(4a \times 4) \times 12 = 4a \times (4 \times 12)$

Commutative Property: This property applies to addition and multiplication. It allows you to place terms separated by addition (or multiplication) in any **order**.

Examples:

$a + b + c = b + c + a$

$953 + 139 + 47 = 47 + 953 + 139$

$2 \cdot 47 \cdot 5 = 2 \cdot 5 \cdot 47$

The Distributive Property allows you to rewrite specific expressions involving multiplication and addition/subtraction without changing the value of the expression. It says that $a(b + c) = ab + ac$.

Example: $3a(a + 2b) = (3a \cdot a) + (3a \cdot 2b)$ $3a^2 + 6ab$

Array Model:

	a	b	b
a	a^2	ab	ab
a	a^2	ab	ab
a	a^2	ab	ab

IMPORTANT CONCEPT ABOUT ALGEBRAIC EXPRESSIONS

Two algebraic expressions are equivalent if we can convert one expression into another by repeatedly applying the Commutative, Associative, and Distributive Properties and the properties of rational exponents to components of the first expression.

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Guided Practice:

Steps for Simplifying Expressions Using Algebraic Properties

1. Identify Like Terms.
2. Use the appropriate properties to regroup and reorder the expression to simplify the expression.

$7x + 18y^2 - 9y^2 + 5x$ $7x + 18y^2 + (-9y^2) + 5x$ COMMUTATIVE $7x + 5x + 18y^2 + (-9y^2)$ ASSOC. $(7x + 5x) + (18y^2 + (-9y^2))$ $12x + 9y^2$	$6n^3 + 3n^2 - 4n^3$ $2n^3 + 3n^2$
$4y^4 - (3y^2 + 3y^4) + y^2$ $4y^4 + (-3y^2) + (-3y^4) + y^2$ $y^4 - 2y^2$	$-m^3 - (2n^2 - m^3) + 6n^2$ $4n^2$
$4(m - 2) + 15$ $4m + 7$	$4x + 3(5x) + 4y - x$ $3x + 15x + 4y$ $18x + 4y$
$12 - 3(4 - t) + 4t$ $7t$	$3g + 3(2 - g) + 4(g + 1)$ $4g + 10$

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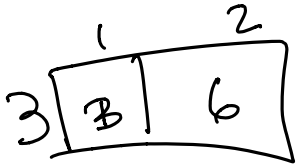
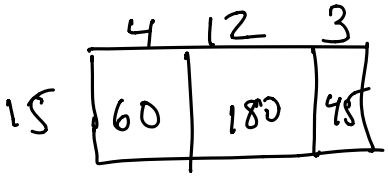
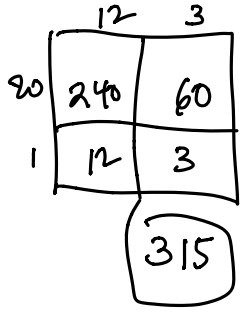
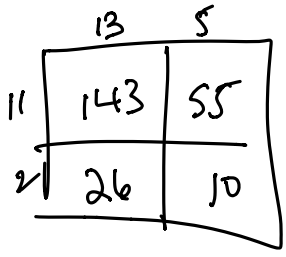
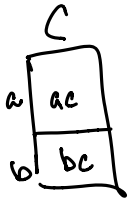
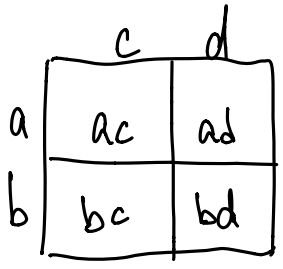
Draw a picture to represent the following expression: $3(1+2)$  $6+3=9$	Draw a picture to represent the following expression: $15(4+12+3)$  285
Draw a picture to represent the following expression: $(20+1)(12+3)$  	Draw a picture to represent the following expression: $(11+2)(13+5)$  =234
Draw a picture to represent the following expression: $(a+b)(c)$  $ac+bc$	Draw a picture to represent the following expression: $(a+b)(c+d)$  $ac+ad+bc+bd$

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The Four Number Game

This is similar to Four 4's activity we did in the beginning of the year. Here are the rules:

1. Your goal is to write each positive integer as a combination of the digits 1, 2, 3, and 4.
2. Each number can only be used once, combined via the operations of addition and multiplication only , as well as grouping symbols.

For instance, 24 can be expressed as $(1 + 3)(2 + 4)$.

Value of Expression	Expression
1	1
2	2
3	
4	
5	
6	
7	
8	
9	
10	
11	2×3+1+4
12	
13	4×3+1
14	
15	3(1+4) / 3×4+1+2
16	4(3+1) / 2(4+1+3)

Value of Expression	Expression
17	
18	
19	
20	
21	(4+3)(2+1) / 4(3+2)+1 / 3(1+2+4)
22	NO
23	NO
24	$(2 + 4)(1 + 3)$
25	(4+1)(3+2) / 4·3·2+1
26	2(3·4+1)
27	3(2·4+1)
28	(3×2+1)4
29	NO
30	(4+1)(3·2)
31	NO
32	(4·2)(3+1)

1. What's the highest number you can make? 36 (4·3)(2+1)

36

2. What numbers can't you make?

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Independent Practice:

Give out Practice 3-2C for Independent Practice.

Activating Prior Knowledge:

No APK—Do the NUMBER TALK

Closure:

IF you were to create a drawing of this expression, what shape do you think it would be? Why?

$$(a + b) \times (c + d) \times (e + f + g)$$

Notes:

In ENY, this loosely translates to lessons 6 and 7 of Alg 1, module 1.

Number Talk

Which expression would result in a larger result?

15×6 *or* 17×4

29×53 *or* 27×55

851×41 *or* 849×43