Day 1 Distributive Property

Let’s review this very important property! You have been using it ever since you learned to multiply two digit numbers, but may not have known the name for it!

The word “distribute” means to “deal out”... Ex. Mrs. Justis distributed the whiteboards to each of her students....

So, in math, when multiplying, numbers are distributed to each of the others.

Ex. 1 What you really are doing is using the distributive property!

\[
3(32) = 3(30 + 2) = 3(30) + 3(2) = 90 + 6 = 96
\]

In Algebra, we use it often, especially when working with polynomials which include variables.

Ex. 2 Simplify this expression: \(4(3x + 5)\)

12x and 20 are unlike terms and cannot be combined, so we have simplified the expression completely.

Sometimes the Distributive Property can be better understood using algebra tiles:

Ex. 3 If \(\square = x\) and \(\square = 1\) The following problem can be represented as shown:

\[
3(x + 2) = 3x + 3 \cdot 2 = 3x + 6
\]

○ Three Groups of \(x\) to get three \(x\)’s
○ Three groups of 2 to get 6

Remember when multiplying constants (number terms...3, -1, 4,...) and variable terms (x, 5a, 2y²), you are simply multiplying the constant and the coefficient (number in front of the variable which indicates how many...For ex. In 7x, 7 is the coefficient, it means there are 7 x’s)

Ex. 4 \(4(3x) = 12x\) or 4 groups of 3x
PROBLEMS DAY 1:

For questions 1-3, Use the distributive property to write an equivalent expression:

1) \(8(3y - 2)\)

2) \(-6(5m - 7)\)

3) \(-3(x^2 + 5x - 8)\)

Day 2: Simplifying Expressions Involving the Distributive Property

What is the difference between Like and Unlike Terms? When can you combine them?

<table>
<thead>
<tr>
<th>Like Terms</th>
<th>Unlike Terms</th>
<th>Why are they Unlike Terms?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2x + 19x)</td>
<td>(2x + 19a)</td>
<td>The variables are different. The exponents are different.</td>
</tr>
<tr>
<td>(4w - 10w)</td>
<td>(4w - 10w^2)</td>
<td>The variables are different.</td>
</tr>
<tr>
<td>(14.2r - 12r)</td>
<td>(12r - 12s)</td>
<td>The exponents are different.</td>
</tr>
<tr>
<td>(32a^2 + 9a^2)</td>
<td>(32a^2 + 9a^3)</td>
<td>The exponents are different.</td>
</tr>
<tr>
<td>(8y + 5y)</td>
<td>(8y + 5)</td>
<td>One term is a constant and the other has a variable.</td>
</tr>
</tbody>
</table>

The distributive property is often used to simplify expressions which also need to have like terms collected during simplification: Examples:

Example 1:
\[
3 \cdot (2x - 8) + 10
\]
\[
6x - 24 + 10
\]
\[
6x - 14
\]

Distribute the 3
Combine like terms

Example 2:
\[
-6 - 4(7 - 4m) + m
\]
\[
-6 - 28 + 16m + m
\]
\[
-34 + 17m
\]

Distribute the -4
*Watch signs
Combine like terms
Problems

Simplify all of the following expressions:

1) \(-2(n - 9) + 4\)

2) \(6x - 3(2 - 3x)\)

3) \(3(1 + 2v) - 3(1 + 4v)\)

4) \(-3p - (-8 + 4p)\)
Day 3: Multiplying Polynomials

Vocabulary:

**Monomial**- Singular term  Ex: \(5x^2\)

**Binomial**- An algebraic expression of two terms  Ex: \((x - 2)\)

**Trinomial**- An algebraic expression of three terms  Ex: \((5x^2 - 3x + 6)\)

Notes and Examples:  Simplify each expression:

**Ex 1) The product of a monomial and a binomial**

\[
-3x^3 \cdot (-5x^8 + 2x^2) \quad \text{Distribute } 3x^3 \\
15x^{11} - 6x^5 \\
\% \text{ Remember the exponent rules}
\]

**Ex 2) The product of two binomials**

\[
(3n + 2) \cdot (n + 3) \\
3n^2 + 9n + 2n + 6 \\
3n^2 + 11n + 6
\]

**Ex 3) The product of a binomial and a trinomial**

\[
(5x + 3) \cdot (-2x^3 + 2x^2 - 6x) \\
-10x^4 + 10x^3 - 30x^2 - 60x + 6x^2 - 18x \\
-10x^4 + 10x^3 - 24x^2 - 18x
\]

* Tip - Multiply the # of terms together to check if you have enough terms before combining. 1st () has 2 terms, 2nd () has 3 terms, \(2 \times 3 = 6\)  We should have 6 terms after multiplying.

******Remember each term in first binomial needs to multiply each term in the trinomial.  No matter how many terms in the factors, this is the process!!
Ex 5) Applications: A rectangular backyard space is depicted by the rectangle below:

George has to mow this backyard. He wants to write a trinomial to represent the area of backyard he has to mow. Write an expression (fully simplified) to represent the area of the backyard in terms of x.

This is a common type of problem that is just like the others we’ve done except you are applying the skills to the real world problems. We know the area of a rectangle is: \( A = L \cdot W \), so to find the area we just need to multiply the length and the width together.

\[
(4x + 3)(2x + 2) = 8x^2 + 14x + 6 \text{ Combine like terms}
\]

\[
8x^2 + 14x + 6 = \text{Solution}
\]

Problems Day 3

Simplify Each Expression for #’s (1-9) Show all work!

1. \(9a^5(-8a^4 + 2a^3)\)

2. \((4x + 6)(-3x - 5)\)

3. \((x + 4)(x^2 + 5x - 2)\)

4. \((2a + b)(3a^2 + 5ab - b^2)\)

5. Anna needs to cover this backyard with a tarp for a fun game of Slip ’N Slide. Write a simplified expression to represent the area of the tarp in terms of x.