

Algebra I
Lesson 1.7 – Simplifying Expressions
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Sometimes using just the **order of operations** can make a simple problem seem harder than what it really is. For example: $3 \cdot 4 \cdot 9 \cdot 25$. With order of operation we move left to right so we get $36 \cdot 25$ gurrrrr! Let's stop and think about this. What other rules do we have from previous math classes?

Commutative property of addition	$a + b + c = c + b + a$	order when just adding does not matter
Associative property of addition	$(a + b) + c = a + (b + c)$	when just adding you can change grouping of the numbers
Commutative property of multiplication	$a \cdot b \cdot c = b \cdot a \cdot c$	order when just multiplying does not matter
Associative property of multiplication	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$	when just multiplying you can change grouping of the numbers
Distributive property	$a(b + c) = ab + ac$	Multiply the outside term with each term in the parentheses

With these rules we can rearrange our expression to:

$4 \cdot 25 \cdot 9 =$	1. using commutative prop. of multiplication – rearrange
$(4 \cdot 25) \cdot 9 =$	2. using associative prop. of multiplication – regroup
$100 \cdot 9 =$	3. simplify
$= 900$	

Simplify:

$$15\frac{1}{3} + 4 + 1\frac{2}{3}$$

$$410 + 58 + 90$$

$$1/2 \cdot 7 \cdot 8$$

$$2 \cdot 29 \cdot 50$$

Sometimes multiplying two numbers can be made easier through distribution:

$9(52) =$ $9(50 + 2) =$ $9(50) + 9(2) =$ $450 + 18 =$ $= 468$	1. rewrite the 52 2. use distribution property 3. simplify
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$$12(98) =$$

$$7(34) =$$

$$6(19)$$

$$6(21)$$

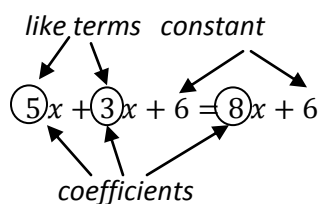
Add:



OK we have 2 apples and 1 strawberry. We added like fruits. It is impossible to add the strawberry to the apples and get 3 apples! (hummm, maybe strapple?)

In math expressions, we have stuff added, subtracted, multiplied, and divided together. The *stuff* have special names.

- **Term** – each piece of *stuff* is called
- **Constant** – if the term is just a number.
- **Like terms** – terms that contain the same variable.
- **Coefficient** – a number in front of the variable.
- Just as we combined the apples together, like terms may be combined



how many x-terms do we have? In one term we have 5 the other we have 3, a total of 8. So our expression simplifies out as shown above.

Combine like terms and simplify: $2x + 3y - 5h + 4x - 3y + 7 + x^2 + 8h + 6y - 3 + 5x$

There are two thought processes that may be used to simplify these problems.

1. Using distribution property to combine like terms. Factor out the common factor to simplify the expression. What? Practice this process; it will be beneficial in advanced applications. Trust me!
2. Combine like terms by adding or subtracting the coefficients and keeping the variables and exponents the same.

Simplify:

$$16p + 24p$$

Distribution

Combine like terms

$$3m^2 - m^2$$

Simplify and ID the steps (think about order of operations too):

$$6(x + 4) + 9$$

$$-12x + 5x - 3a + x$$