

Hayfield Secondary School



Summer Math Guide

Algebra I and Algebra I Honors

Directions:

Complete each lesson by watching the video lesson and filling in the notes and examples.

After each video, complete ALL "Try it on your own" problems.

This packet will be collected by your Math teacher at the beginning of the year.

YouTube videos can be found by searching for "Mary Scully" and locating the Algebra Summer Playlist.

Lesson 1: Simplifying Algebraic Expressions—Combining Like Terms

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the “Try on your own” problems.

https://youtu.be/mNuT_gIOwCA

We can *simplify* Algebraic Expressions by...

1)

2)

What are **Terms**?

Terms are parts of an expression separated by _____.

$-4xy$ _____ term(s)	$x^2 - 16$ _____ term(s)	$-4y + 6x - xy$ _____ term(s)
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Try on your own

How many terms?

- $-2a + 3a$ _____
- $3n$ _____
- $y^2 + 2y - 15$ _____

What are **Like Terms**?

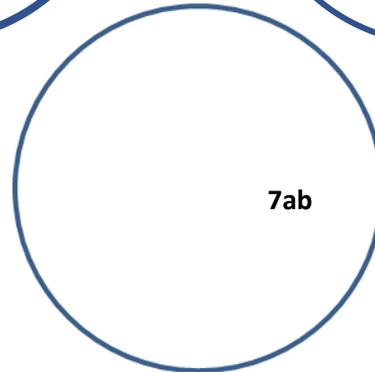
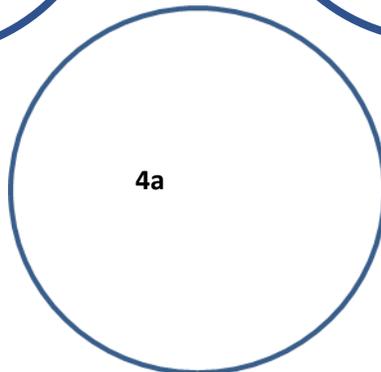
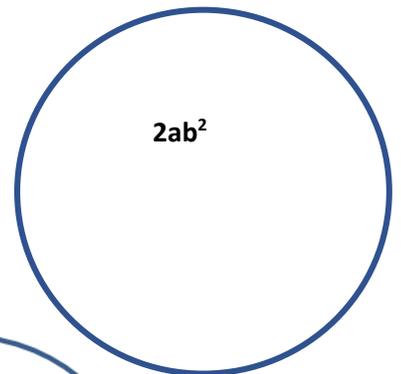
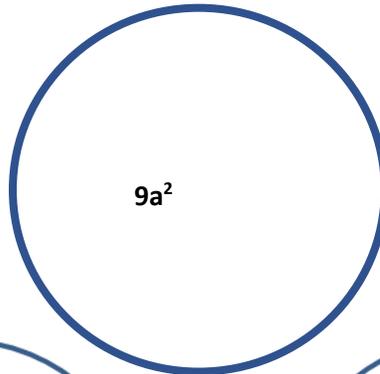
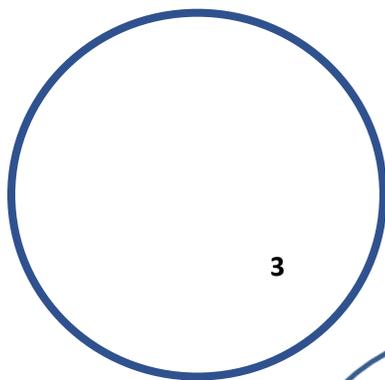
Like terms have the same _____ with the same _____.

Examples of like terms	NOT like terms

Try on your own!

Group **like terms** by placing like terms into the correct circle.

8	$5ab^2$	$6a^2$	5	2a
11ab	3a	$4a^2$	ab	16ab
$53ab^2$	32	9	ab^2	a^2
18a	43ab	a	$5a^2$	12
$2ab^2$	10a	5ab	43a	$10ab^2$



HOW DO YOU COMBINE LIKE TERMS?

You _____ the _____ of the like terms.

Example 1: Simplify the expression.

a) $2a + 3a - 8b$

b) $5n + n - 3n^3$

c) $6x^2 + 9x + y^2 - 9x - 4y^2$

Try on your own: Simplify the expression

$3x - 6x - 2y^4 + 8y$

$7 + 3x - 9 - 15x^2 - 5x$

Lesson 2: Simplifying Expressions—Distributive Property

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the “Try on your own” problems.

<https://youtu.be/X7qDk-dnHZo>

Distributive Property

The **Distributive property** is _____ distributed over _____ or _____.

THE DISTRIBUTIVE PROPERTY

The product of a and $(b + c)$:

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

Example: $5(x + 2) = 5x + 10$

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

Example: $(x + 4)8 = 8x + 32$

The product of a and $(b - c)$:

$$a(b - c) = ab - ac$$

Example: $4(x - 7) = 4x - 28$

$$(b - c)a = ba - ca$$

Example: $(x - 5)9 = 9x - 45$

Example: Simplify the Expressions

$$(1 + 2n)8$$

$$-x - (3x + x^2)$$

Try on Your Own! Simplify the Expressions

$$(2x - 4) \frac{1}{2}$$

$$-(6 - 3x)$$

Putting it all together!

We have learned how to simplify algebraic expressions by combining like terms and using the distributive property. Sometimes we will have to use both in one problem.

First: _____

Second: _____

Example: Simplify.

$$2(-2 - 5q + 8) - (3q + y - 3)$$

Try On Your Own! Simplify.

$$4x - 3(2x - 5) + 7$$

Lesson 3: Properties of Equality and Inequality

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

<https://youtu.be/dEFiVHW-VvE>

PROPERTIES

Property Name		Description	Example
Commutative	Addition		$A + B = B + A$
	Multiplication		$A \cdot B = B \cdot A$
Associative	Addition		$A + (B + C) = (A + B) + C$
	Multiplication		$A(BC) = (AB)C$
Identity	Addition		$A + 0 = A$
	Multiplication		$A \cdot 1 = A$
Inverse	Addition		$A + (-A) = 0$
	Multiplication		$A \cdot \frac{1}{A} = 1$
Distributive			$A(B + C) = AB + AC$ $A(B - C) = AB - AC$

Properties of Equality

Property Name	Description	Example
Reflexive		$A = A$
Symmetric		$A + B = B + A$
Transitive		If $A = B$ and $B = C$, then $A = C$
Substitution		If $x = y$, then y can be substituted for x in any expression
Addition of Equality		If $x = y$, then $x + z = y + z$

More Properties of Equality

Subtraction of Equality		If $x = y$, then $x - z = y - z$
Multiplication of Equality		If $x = y$, then $xz = yz$
Division of Equality		If $x = y$, then $\frac{x}{z} = \frac{y}{z}$

Identifying Properties

Steps	Justification
$74 = 8 + 3v$	Original problem
$74 - 8 = 8 + 3v - 8$	
$74 - 8 = 8 - 8 + 3v$	
$66 = 0 + 3v$	
$66 = 3v$	
$\frac{66}{3} = \frac{3v}{3}$	
$22 = v$	Solution

Try On Your Own

Steps	Justification
$2(2d - 1) = 61$	Original Problem
$4d - 2 = 61$	
$4d - 2 + 2 = 61 + 2$	
$4d + 0 = 63$	
$4d = 63$	
$\frac{4d}{4} = \frac{63}{4}$	
$d = \frac{63}{4}$	Solution

Lesson 4: Solving Equations

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the “Try on your own” problems.

<https://youtu.be/kPIdYJ9Sh30>

Multistep Equations (distributing and combining like terms)

When solving multistep equations, our goal is still to isolate that variable. This time we just have extra steps compared to a two-step equation.

Steps for Multistep Equations

1.

a.

b.

2.

a.

b.

3.

Example: Solve the equation and write your answer in set builder notation.

$$-24 = 4(6a - 6)$$

Try on your own!

Solve the equation and write your answer in set builder notation. Don't forget to check your work!

$$3 = -(v - 8)$$

Example: Solve the equation and write your answer in set builder notation.

$$8n + 7 - 7n = 12$$

Try on your own!

Solve the equation and write your answer in set builder notation. Don't forget to check your work!

$$m + 4m - 10 = 12$$

Let's put it all together!

Example: Solve the equation and write your answer in set builder notation.

$$6b + 8(-7b - 3) = -24$$

Try on your own!

Solve the equation and write your answer in set builder notation. Don't forget to check your work!

$$6(4 + 2x) + 6 = -66$$

Lesson 5: Solving Inequalities

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the “Try on your own” problems.

https://youtu.be/MJ_rXPvIMml

VOCABULARY

Inequality:

Solution:

Inverse Operations:

Solving Inequalities

We solve inequalities just like solving equations, we use the inverse operations, and we follow:

SPECIAL RULE: If you divide or multiply both sides by a _____
number you must _____!

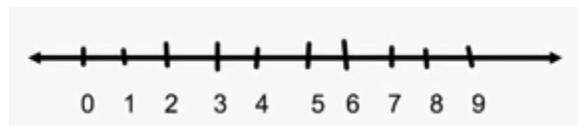
Example: Solve, Check, and Graph

$$3x - 12 \geq 9$$

Solution: _____

CHECK:

Graph:



Solving Multistep Inequalities

- Just like with equations

DISTRIBUTE

COMBINE

SOLVE

Example: Solve the inequality

$$5(-3x - 5) \geq -28$$

TRY ON YOUR OWN!

Solve the inequality

$$2x - (x - 3) + 5 < 14$$

Lesson 6: Functions

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

<https://youtu.be/JCEQoHg1p6k>

VOCABULARY

Coordinate (Cartesian) Plane:

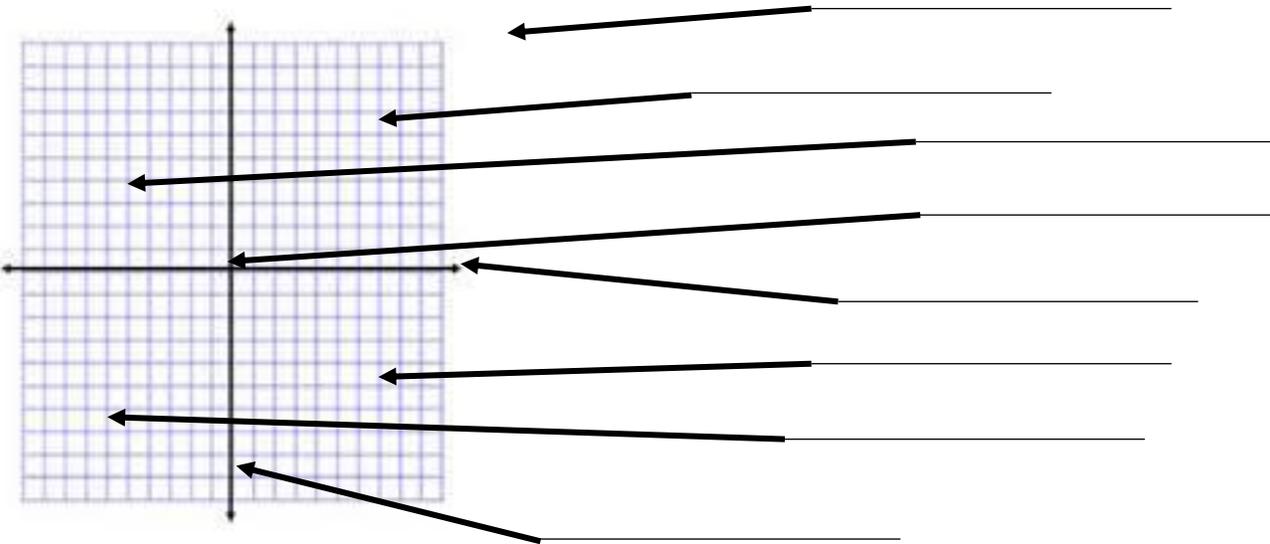
X-axis:

Y-axis:

Origin:

Quadrant:

Label the parts of the graph!

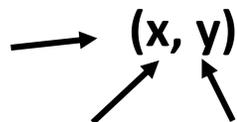


ORDERED PAIRS:

X-Coordinate (abscissa):

Y-Coordinate (ordinate):

Label the parts of an ordered pair:



Relation:

Example:

Function:

Is this a function?

$\{(9,8), (-3,4), (1,2)\}$

This would make it still a function

This would make it not a function

Other ways to show a relation:

Mapping:

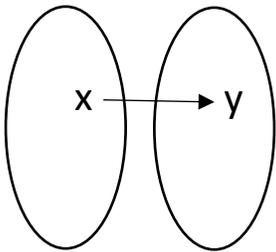
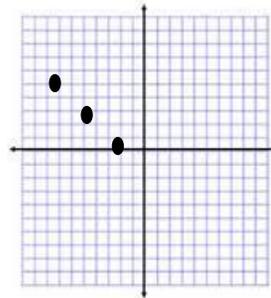


Table:

X	Y

Graph:



VERTICAL LINE TEST:

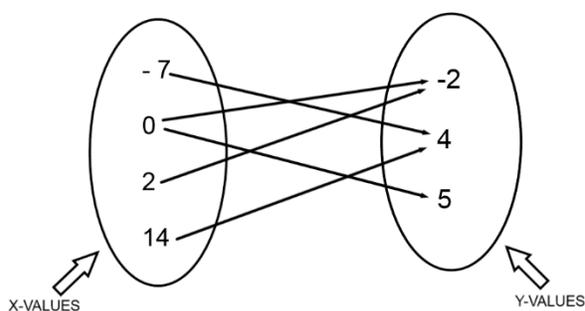
TRY ON YOUR OWN!

Is this a function or a relation?

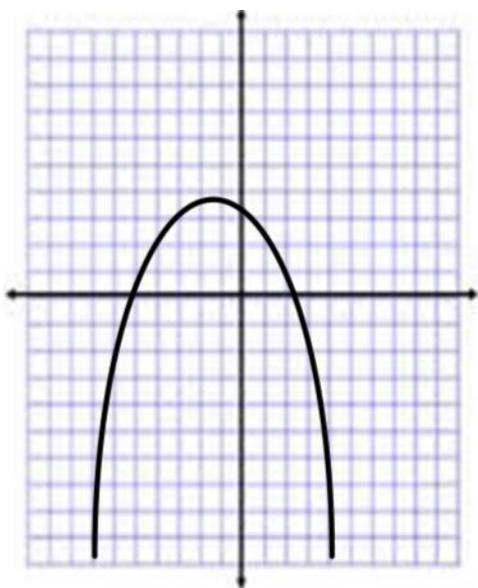
a)

X	Y
9	1
4	1
0	1
-5	1

b)



c)



Lesson 7: Exponent Laws

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

<https://youtu.be/hFUZVntd8Qk>

QUICK REVIEW

$$5x^3$$

Expanded Form

Exponent Form

	NAME	FORM	EXAMPLE
LAW 1	Product of Powers		
LAW 2	Power of a Product		
LAW 3	Quotient of Powers		
LAW 4	Power of a Quotient		
LAW 5	Power of a Power		
LAW 6	Negative Exponent		
LAW 7	Zero Exponent		

Try it on your own!

Identify the Exponent Rule and simplify. Write your answer in positive exponents.

a. $\frac{p^2}{p^6}$

b. $c^6 \cdot c^5$

c. $(h^9)^{10}$

d. $(y^2)^9$

e. $w^4 \cdot w^7$

f. $\frac{a^{10}}{a^2}$