Algebra 1 Summer Packet

Name:_____
Miss Young
Algebra 1 Readiness Packet

Dear Algebra 1 Students,

Congratulations on completing another school year! I am asking that each of you complete this packet in order to help keep your math skills strong while you enjoy your summer break and to prepare you for Algebra 1 with me in September. The packet will be due on your first day of school. It will be the first grade of your 1st quarter of Algebra 1! You are expected to complete the packet in full, showing your work **as much as possible**. Below you will find a suggested timeline of completion.

Suggested Timeline for Completion:

- ◯ Week 1: Part 1 - The Distributive Property
- ◯ Week 2: Part 2 - Combing Like Terms
- ◯ Week 3: Part 3 - Solving Equations with Variables on One Side
- ◯ Week 4: Part 4 - Solving Equations with Variables on Both Sides
- ◯ Week 5: Part 5 - Rate of Change & Slope
- ◯ Week 6: Part 6 - Graphing on the Coordinate Plane
- ◯ Week 7: Part 7 - Linear Equations in Slope-Intercept Form

Good luck & have a wonderful summer!
Can't wait to see you all in September!

Blessings,
Miss Young

Name:_____

Part 1: The Distributive Property

Below are some examples to help you solve the problems in this section.

Example 1: Simplify 3(n - 8)

3(n - 8) **Write down the problem**
3(n) + 3(-8) **Multiply each term by 3** **(note the 3 is positive because it does not have a sign in front of it)**
3n - 24 **Simplified answer**

Example 2: Simplify -5(-2x + 4)

-5(-2x + 4) **Write down the problem**
-5(-2x)-5(4) **Multiply each term by -5**
10x - 20 **Simplified answer**

Practice

Directions: Rewrite each expression using the Distributive Property. **Show your work!**

1. 7(h - 3)
2. -3(2x + 5)

Part 2: Combining Like Terms

Below are some examples to help you solve the problems in this section.

Like-terms have the same variables to the same power.

Like-terms: $5x^2$ and $-6x^2$

NOT like-terms: $9x^2$ and 15x

Example 1		**Example 2**
Simplify by combining like terms		Simplify by combining like terms
$8x^2 + 9x - 12x + 7x^2$		$-5x^2 + 6x - 4x^2 + 4x + 4$
$8x^2 + 7x^2 + 9x - 12x$	<--(Regroup like-terms)-->	$-5x^2 - 4x^2 + 6x + 4x + 4$
$15x^2 - 3x$	<--(Combine like-terms)-->	$-9x^2 + 10x + 4$

Practice

Directions: Simplify by combining like terms. **Show your work!**

3. $c^2 + 4d^2 - 7d^2$
4. $5x^2 + 6x - 12x^2 - 9x + 2$
5. $2(3x - 4y) + 5(x + 3y)$
6. $10xy - 4(xy + 2x^2y)$

Part 3: Solving Equations with Variables on One Side

Below are some instructions/examples to help you solve the problems in this section.

To solve an equation means to *find the value* of the variable. We solve equations by using opposite operations to isolate the variable.

Example 1

-6x = 36

$\frac{-6x}{-6} = \frac{36}{-6}$ **Isolate x by dividing both sides by -6**

x = -6 **Simplified answer**

Example 2

$\frac{3}{4}x = 12$

$\frac{4}{3} \cdot \frac{3}{4}x = 12 \cdot \frac{4}{3}$ **Isolate x-multiply both sides by reciprocal**

$x = \frac{48}{3}$

$x = 16$ **Simplified answer**

Example 3

3x - 2 = 10

+2 +2 **Isolate 3x by adding 2 to each side (+ is the opposite of -).**

$\frac{3x}{3} = \frac{12}{3}$ **Isolate x by dividing by 3 on each side ($\div$ is the opposite of $\times$)**

x = 4

Practice

Directions: Solve each equation. **Show your work!**

7. $-14 + y = -2$

8. $14n - 8 = 34$

9. $8k = -64$

10. $\frac{2}{5}x = 6$

Part 4: Solving Equations with Variables on Both Sides

Below are some instructions/examples to help you solve the problems in this section.

Example 1

$4(2a-1) = -10(a-5)$ **Original Equation**

$4(2a)+4(-1) = -10(a)-10(-5)$ **Distributive Property**

$8a-4 = -10a+50$ **Simplify & add 10a to each side**
$+10a \quad +10a$

$18a-4=50$ **Simplify & add 4 to each side**
$+4 \quad +4$

$18a=54$ **Simplify**

$\frac{18a}{18} = \frac{54}{18}$ **Divide each side by 18**

$a=3$ **Simplified answer**

Example 2

$9(x+4)=5(2x-3)$ **Original Equation**

$9(x)+9(4)=5(2x)+5(-3)$ **Distributive Property**

$9x+36=10x-15$ **Simplify & subtract 9x from each side**
$-9x \quad -9x$

$36=x-15$ **Simplify & add 15 to each side**
$+15 \quad +15$

$51=x$ **Simplify**

Practice

Directions: Solve each equation. Use your own paper to **Show your work!**

11. $5+3r=5r-19$

12. $8x+12=4(3+2x)$

13. $-5x-10=2-2(x-4)$

14. $6(-3m+1)=5(-2m-2)$

Part 5: Rate of Change and Slope

Below are some instructions/examples to help you solve the problems in this section.

The letter *m* is used to represent slope.

Slope formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

*Ordered pair 1 is represented by (x_1, y_1) and ordered pair 2 is represented by (x_2, y_2).

Example 1	Example 2
Find the slope of the line that passes through (-3,5) and (4,-2).	**Find the slope of the line that passes through (-2,6) and (-4,-8).**
Step 1: Label the ordered pairs (x_1, y_1) and (x_2, y_2)	**Step 1: Label the ordered pairs (x_1, y_1) and (x_2, y_2)**
(-3,5) and (4,-2).	**(-2,6) and (-4,-8).**
(x_1, y_1) (x_2, y_2)	(x_1, y_1) (x_2, y_2)
Step 2: Plug in the values to the formula and simplify.	**Step 2: Plug in the values to the formula and simplify.**
$m = \frac{-2-5}{4-(-3)}$	$m = \frac{-8-6}{-4-(-2)}$
$m = \frac{-7}{7}$	$m = \frac{-14}{-2}$
$m = -1$	$m = 7$

In both of these examples, when simplifying, the answer became an integer(a positive or negative whole number). This is not always the case. For example, if you had a fraction such as $\frac{6}{8}$, you would simplify by dividing by 2 to get a final answer of $\frac{3}{4}$. Keep this in mind when simplifying!

Practice

Directions: Find the slope between each pair of points. **Show your work!**

15. (4,9), (1,-6)

16. (1,-2), (-2,-5)

17. (-3,7), (5,11)

Part 6: Graphing in the Coordinate Plane

Below are some instructions/examples to help you solve the problems in this section.

When graphing points in the coordinate plane plot the ordered pair by starting at the origin (0,0) and then moving left or right to the x value and up or down for the y value.

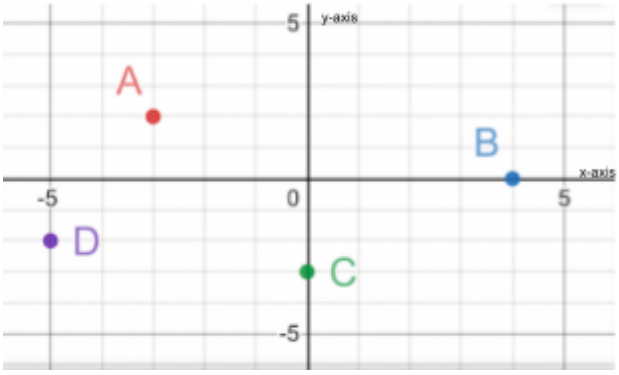
When writing the ordered pair for a point on the coordinate plane read the x value first then the y value. The ordered pair is written as (x, y)

Point A(-3, 2)
left 3, up 2

Point B(4, 0)
right 4, up 0

Point C(0, -3)
right 0, down 3

Point D(-5, -2)
left 5, down 2



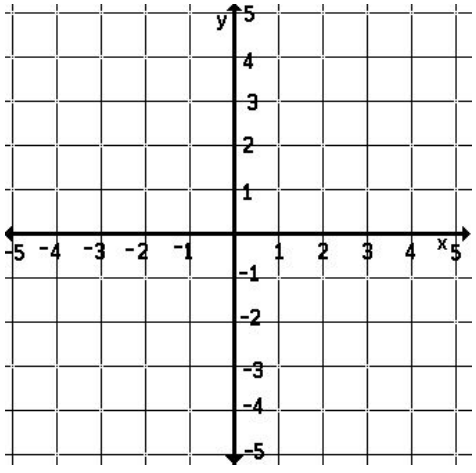
Practice

Directions: Plot the following points on the coordinate plane. Label with the given letter.

18. Point E (1, 1)

19. Point F (-2, 2)

20. Point G (-3, -3)



Part 7: Linear Equations in Slope-Intercept Form

Below are some instructions/examples to help you solve the problems in this section.

Slope Intercept Form: $y = mx + b,$ *where m is the slope and b is the y − intercept*

Example 1: Given a slope of -4 and a y-intercept of 3 write the equation of the line in slope-intercept form.

Step 1: Determine m and b — $m = -4$ *and* $b = 3$

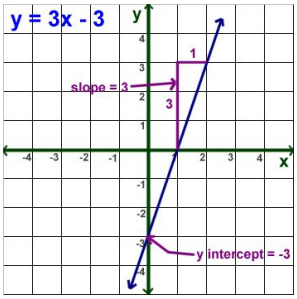
Step 2: Plug m and b into the equation — $y = -4x + 3$ **(this is +3 because 3 is understood to be positive)**

Example 2: Writing the equation of a line given a graph.

Step 1: Locate the y-intercept (the point where the graph crosses the y-axis) — $b = -3$

Step 2: Count to find the slope (use rise over run) — $m = \frac{3}{1}$

Step 3: Write the equation in $y = mx + b$ form — $y = 3x - 3$

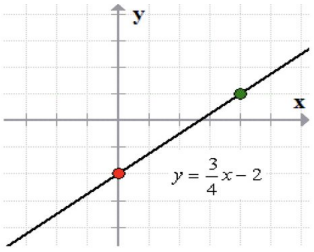


Example 3:

Step 1: Locate the y-intercept (the point where the graph crosses the y-axis) — $b = -2$

Step 2: Count to find the slope (use rise over run) — $m = \frac{3}{4}$

Step 3: Write the equation in $y = mx + b$ form — $y = \frac{3}{4}x - 2$



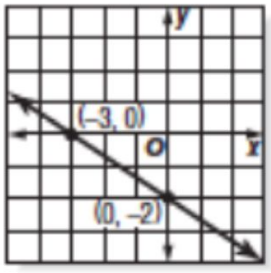
Practice

Directions: Write an equation in slope-intercept form.

21. Slope: ¼, y-intercept: 3

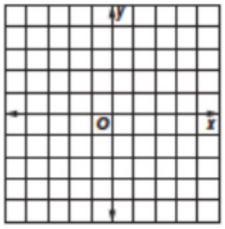
22. Slope: -2.5; y-intercept: 3.5

23.



Practice: Graph each equation using slope and y-intercept.

24. $y = -\frac{1}{2}x + 2$



25. $y = 2x + 2$