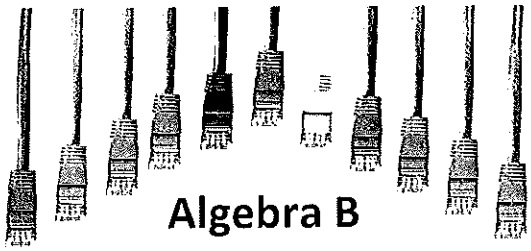
Regina

Summer Math Review

For students who will be taking

Algebra B

Completed review packet is due the first day of classes.



Algebra B
Summer Review Packet

Welcome to Algebra B!

In the following pages, you will find review materials that will prepare you for next year's math course. Please take the exercises seriously as this will allow us to hit the ground running in the fall. These skills have already been taught and are necessary for success. If the examples preceding the practice problems are not enough of a reminder of a concept, please remember that Kahn Academy, YouTube, and math.com are very useful resources!

The review materials are separated into sections. Doing one section a week is only a suggestion. You will have the most benefit from this material if you work on it throughout the summer and do a final review of your work a week or two before school starts. This packet is due the first day of school.

Your completion of the packet will be recorded. It is not okay to skip sections where you are weak. Those are the skills you need to strengthen over the summer. You will be assessed on these skills during the first two weeks of school. Exact assessment dates will be announced by your teacher.

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Materials Needed for Algebra

- Scientific Calculator (TI-30XIIS preferred)
- Folder/Binder dedicated to this class
- 1 Notebook for Notes/Homework etc. **OR** 3-Ring Binder with loose-leaf paper

Algebra B Summer Review

Week 1: Real numbers and Operations

Types of Real Numbers:

Natural (Counting): 1, 2, 3, 4, ...
Whole: 0, 1, 2, 3, ...
Integers: ... -2, -1, 0, 1, 2, ...
Rational: Can be written as a fraction or a repeating or terminating decimal
Irrational: Not rational

Properties of Addition and Multiplication (Addition shown first, Multiplication second)

1.	Commutative Property:	$a+b=b+a$	$a\cdot b=b\cdot a$
2.	Associative Property:	$(a+b)+c=a+(b+c)$	$a(b\cdot c)=(a\cdot b)c$
3.	Identity Property:	$a+0=a$	$a\cdot 1=a$
4.	Inverse Property:	$a+(-a)=0$	$a\cdot\frac{1}{a}=1$
5.	Distributive Property:	$a(b+c)=ab+bc$	

Classify each variable according to the set of numbers that best describes its values.

1. the area of the circle *A* found by using the formula πr^2 1._____
2. the number *n* of equal slices in a pizza; the portion *p* of the pizza in one slice 2._____
3. the air temperature *t* in Saint Paul, MN, measured to the nearest degree Fahrenheit 3._____
4. the last four digits *s* of a Social Security number 4._____

Plot the following values on the number line provided. Please label each by its exercise number.

5. $5\frac{1}{2}$ 6. -4 7. 2.25 8. $-6\frac{1}{3}$ 9. $\sqrt{8}$

Compare the two numbers. Use >, <, or =. A calculator should not be used.

10. $-\sqrt{2}$ -2 11. $\sqrt{29}$ 5 12. 4 $\sqrt{17}$ 13. $\sqrt{50}$ 6.8

Name the property of real numbers illustrated by each equation.

14. $2(3+\sqrt{5})=2\cdot 3+2\cdot\sqrt{5}$ 14._____
15. $16+(-13)=-13+16$ 15._____
16. $-7\cdot\left(-\frac{1}{7}\right)=1$ 16._____
17. $5(0.2\cdot 7)=(5\cdot 0.2)\cdot 7$ 17._____

Week 2: Algebraic Expressions and Models

Order of Operations	Vocabulary
Parentheses Exponents Multiplication/Division Addition/Subtraction	Terms: Parts added together to make an expression. Coefficients: The number located in front of the variable. Constant: Numbers in an expression without a variable.

Write an algebraic expression that models each word phrase.

1. seven less than the number t 1._____
2. the sum of 11 and the product of 2 and a number r 2._____

Write an algebraic expression that models each situation.

3. Arin has \$520 and is earning \$75 each week babysitting. 1._____
4. You have 50 boxes of raisins and are eating 12 boxes each month. 2._____

Evaluate each expression for the given values of the variables.

5. $-4v + 3(w + 2v) - 5w \quad v = -2 \quad w = 4$ 5._____
6. $c(3 - a) - c^2 \quad a = 4 \quad c = -1$ 6._____
7. $2(3g - 5f) + 3(g + 4f) \quad g = 3 \quad f = -5$ 7._____

Simplify by combining like terms.

8. $5x - 3x^2 + 16x^2$
9. $\frac{3(a-b)}{9} + \frac{4}{9}b$ 8._____
10. $t + \frac{t^2}{2} + t^2 + t$ 9._____
11. $4a - 5(a + 1)$ 10._____ 11._____

Identify the following components from the expression $5x^7 - 8x + 47$

12. The number of terms 12._____
13. Leading coefficient 13._____
14. Constant Term 14._____

Week 3: Solving Linear Equations

Remember to solve equations, you can add, subtract, multiply or divide by any number or variable as long as you do the same operation to the other (entire) side.

Example:

$\frac{2}{5}(x-3) = x-2$	Original Problem
$\frac{2}{5}x - \frac{6}{5} = x-2$	Distribute the $\frac{2}{5}$ to each term on the left side of the =
$5\left(\frac{2}{5}x - \frac{6}{5}\right) = 5(x-2)$	Multiply both sides of the equation by 5 to get rid of the fractions on the left
$2x-6 = 5x-10$ $-5x \quad -5x$	Subtract $5x$ on each side
$-3x-6 = -10$ $+6 \quad +6$	Add 6 on each side
$\frac{-3x}{-3} = \frac{-4}{-3}$	Divide both sides by -3
$x = \frac{4}{3}$	Solve for x.

Check your solution by plugging the value into the original equation.

Solve each equation.

1. $9(z-3) = 12z$ 1._____
2. $7y+5 = 6y+11$ 2._____
3. $5w+8-12w = 16-15w$ 3._____
4. $3(x+1) = 2(x+11)$ 4._____
5. $\frac{1}{3}(y-2) = y+4$ 5._____
6. $4-\frac{2}{3}x = -7$ 6._____

Write an equation to solve each problem.

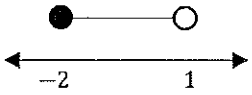
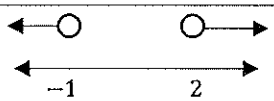
7. Two brothers are saving money to buy tickets to a concert. Their combined savings is \$55. One brother has \$15 more than the other. How much has each saved?

8. What three consecutive numbers have a sum of 126?

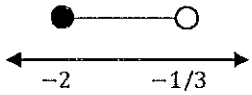
9. Two trains left a station at the same time. One traveled north at a certain speed and the other traveled south at twice that speed. After 4 hours, the trains were 600 miles apart. How fast was each train traveling?

Week 4: Solving Inequalities

*Remember, when you multiply or divide each sides of an inequality by a negative, you must reverse the inequality symbol.
*Closed dot represents $\geq$ *and* $\leq$. This means the value is included in the solution.
*Open dot represents $>$ *and* $<$. This means our value is not included in the solution.
Compound Inequalities: Two simple inequalities joined by the words "and" or "or".

AND: $-2 \leq x < 1$	OR: $x < -1$ *or* $x \geq 2$
	

Example:

$3 < -6x + 1 \leq 13$	Original Problem
$3 < -6x + 1 \leq 13$ $-1 \quad -1 \quad -1$	Subtract 1 on each side
$\frac{2}{-6} < \frac{-6x}{-6} \leq \frac{12}{-6}$	Divide each side by -6 **Remember to reverse each inequality sign
$-\frac{1}{3} > x > -2$	Final Answer
	Graph

Write the inequality that represents the sentence.

1. Five less than a number is at least -28.
2. The product of a number and four is at most -10.
3. Six more than a quotient of a number and three is greater than 14.

Solve each inequality. Graph the solution.

4. $5a - 10 > 5$
5. $25 - 2y \geq 33$
6. $-2(n + 2) + 6 \leq 16$
7. $2(7a + 1) > 2a - 10$

Solve each compound inequality. Graph the solution.

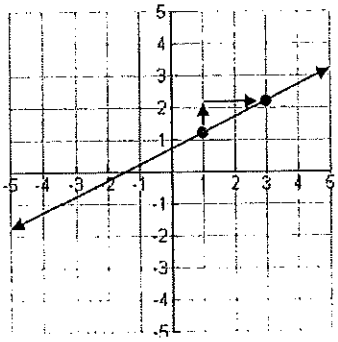
8. $-8 < 4x < 12$
9. $-2 \leq 3x - 8 \leq 10$
10. $2x + 3 < 12$ or $4x - 7 > 21$
11. $2x > 3 - x$ or $2x < x - 3$

Week 5: Lines

Finding Slope m

$$m = \frac{\Delta y}{\Delta x} = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$$

Finding Slope from a Graph



$\Delta y = 1$ Positive because it went up
Δx=2 Positive because it went right
Therefore, $m = \frac{1}{2}$.

Finding Slope from Two Points

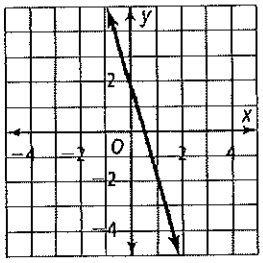
Example: Find the slope from the two points $(-2,7)$ and $(3,-1)$

$$\frac{-1-7}{3-(-2)} = \frac{-8}{5}$$

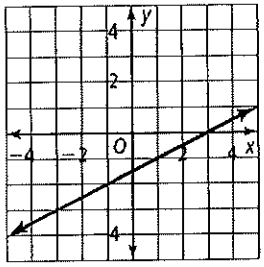
$$m = -\frac{8}{5}$$

Find the slope from the following lines or points.

1.



2.



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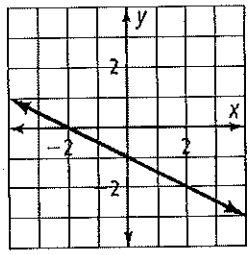
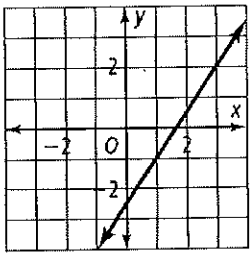


4.



5. $(8,10)$, $(-7,14)$

$m =$_____

6. $(-19,6)$, $(15,16)$

$m =$_____

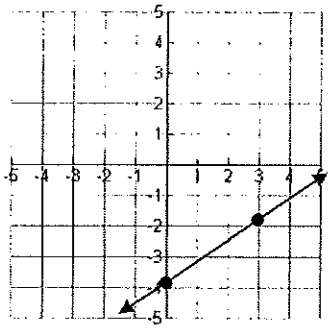
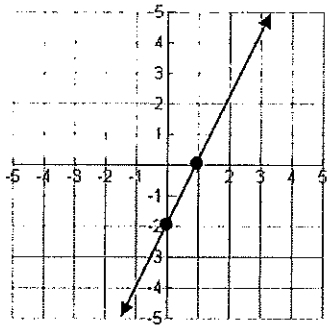
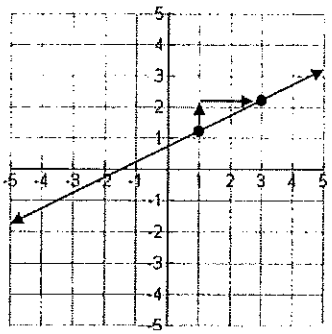
7. $(-18,-20)$, $(-18,5)$

$m =$_____

8. $(4,7)$, $(8,7)$

$m =$_____

Week 6: Graphing Linear Equations

Slope-Intercept Form	Standard Form	Point-Slope Form
$y = mx + b$	$Ax + By = C$	$y - y_1 = m(x - x_1)$
m is slope of the line	x-intercept is $\frac{C}{A}$ (where $y = 0$)	m is the slope of the line
b is the y-intercept $(0, b)$	y-intercept is $\frac{C}{B}$ (where $x = 0$)	(x_1, y_1) is a point on the line
	Graph both intercepts and connect with a line	Graph the point, then use the slope to graph more points
Example:	Example:	Example:
Graph $y = \frac{2}{3}x - 4$	Graph $-2x + y = -2$	Graph $y - 1 = \frac{1}{2}(x - 1)$
y-intercept is -4 or $(0, -4)$	x-intercept is $\frac{-2}{-2} = 1 \rightarrow (1,0)$	Point: $(1,1)$
slope is $\frac{2}{3} \rightarrow$ move up 2, right 3	y-intercept is $\frac{-2}{1} = -2 \rightarrow (0, -2)$	Slope: $\frac{1}{2} \rightarrow$ move up 1, right 2
		

Identifying the x- and y-intercepts in Any Form

x-intercept is the point on the x-axis where the graph crosses. This is also the line where $y = 0$. Substitute $y = 0$ to find the x-value of this point.

y-intercept is the point on the y-axis where the graph crosses. This is also the line where $x = 0$. Substitute $x = 0$ to find the x-value of this point.

Example:

Find the x- and y-intercepts. $y - 3 = 3(x + 1)$

x-intercept: $y = 0$: $0 - 3 = 3(x + 1)$

Solve $-3 = 3x + 3$

$-6 = 3x$

$x = -2$

x-intercept: $(-2,0)$

y-intercept: $x = 0$: $y - 3 = 3(0 + 1)$

$y - 3 = 3(1)$

$y - 3 = 3$

$y = 6$

y-intercept: $(0,6)$

Graph each equation. Fill-in the appropriate information.

1. $x + y = 3$

x-intercept:_____

y-intercept:_____

Slope:_____

2. $y = -2x - 3$

x-intercept:_____

y-intercept:_____

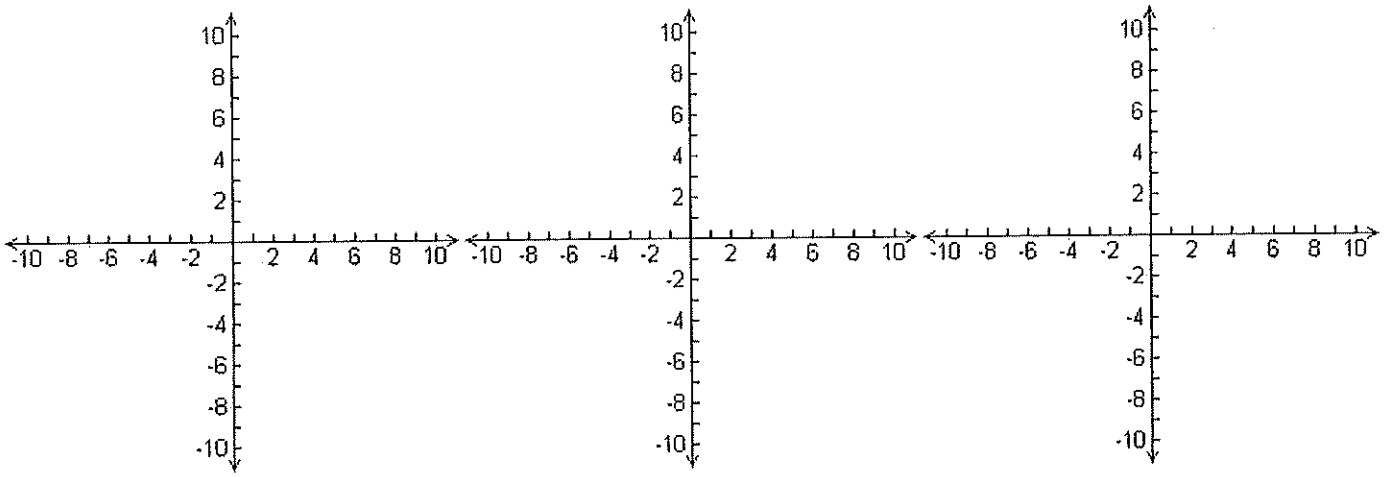
Slope:_____

3. $y = 5x - 2$

x-intercept:_____

y-intercept:_____

Slope:_____



4. $y - 4 = \frac{1}{2}(x + 3)$

Point:_____

Slope:_____

x-intercept:_____

y-intercept:_____

5. $y - 5 = 2(x - 3)$

Point:_____

Slope:_____

x-intercept:_____

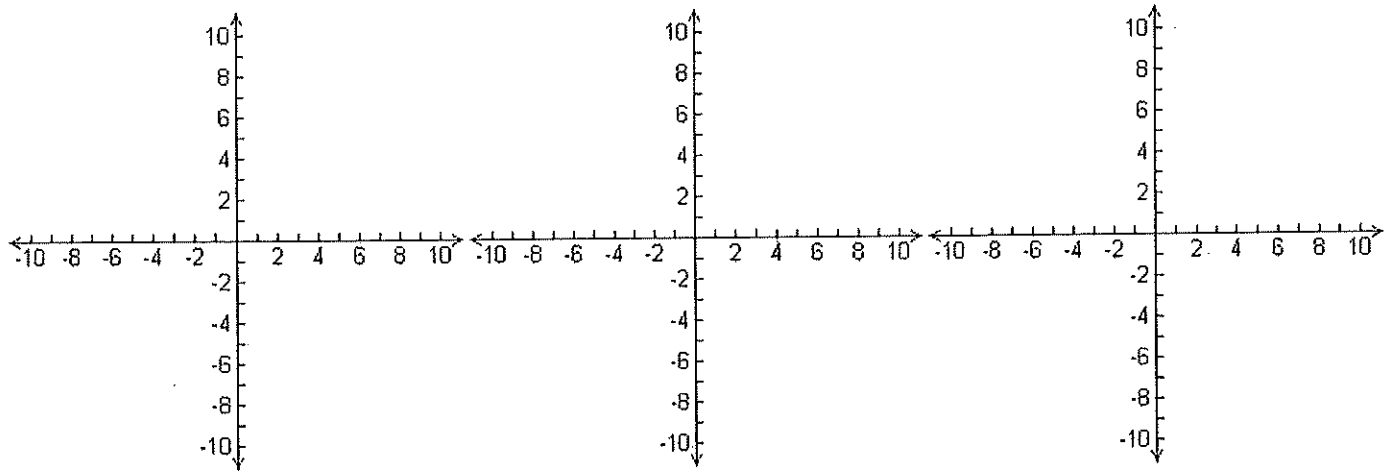
y-intercept:_____

6. $x + 4y = 4$

x-intercept:_____

y-intercept:_____

Slope:_____



Week 7: Word Problems

1) The length of a rectangle is 6 inches more than its width. The perimeter of the rectangle is 24 inches. What is the length of the rectangle?

2) The width of a rectangle is 2 cm less than its length. The perimeter of the rectangle is 16 cm. What is the length of the rectangle?

3) The sum of three *consecutive integers* is 147. Find the three integers.

4) The sum of three consecutive integers is 48.

Use a highlighter to highlight the information that is important for each problem. Then, make an equation to solve the problem. A table may help to make the problem clearer.

5) A train leaves a train station at 1 p.m. It travels at an average rate of 72 miles per hour. A high-speed train leaves the same station an hour later. It travels at an average rate of 90 miles per hour. The second train follows the same route as the first train on a track parallel to the first. In how many hours will the second train catch up with the first train?

6) A group of campers and one group leader left a campsite in a canoe. They traveled at an average rate of 8 miles an hour. Two hours later, the other group leader left the campsite in a motor boat. He traveled at an average rate of 18 miles an hour. How long after the canoe left the campsite did the motor boat catch up with it?

1. Noya drives into the city to buy a software program at a computer store. Because of traffic conditions, she averages only 15 mi/h. On her drive home she averages 35 mi/h. If the total travel time is 2 hours, how long does it take her to drive to the computer store