Optional Summer Assignment
Course Title: Intensified Algebra 2/Trigonometry

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Purpose of Assignment:
It is designed to allow you to review the material that you have already covered in your Algebra 1 and Geometry courses. Since the Intensified Algebra 2/Trig curriculum is extensive, completing this assignment will allow you to get a jump start on the course.

Estimated time to complete Assignment: 4-6 hours

Due date and method of assessment for Assignment:
During the second week of school you turn in your completed assignment and you will have a quiz on this material. The material in this packet is previously learned material, so the assignment is strongly recommended if students want to check their understanding of that material. Complete as much of the assignment as possible before school begins and come prepared with any questions you might have.

Instructions for Assignment:
The packet is to be completed in its entirety. Please use the links to tutorials for material that you don't remember from Algebra 1. You must show your work where applicable. Answers to problems must be circled to facilitate grading. Most importantly, the work should be neat! Tests and quizzes in Algebra 2 Intensified will often be taken without a calculator. It is important for students to be comfortable solving problems without a calculator to be successful in this class. The packet should be completed without the aid of a calculator to help practice this. The quiz on this material will also be without a calculator. For times that we will use a calculator in class, a graphing calculator is important. You must have your own graphing calculator (TI-83 or TI-84). If you do not currently own one, please purchase one before the start of the school year. If this is an issue, please contact one of us so that we can find a solution.

We look forward to seeing you in September!

-Mrs. Harris, Mrs. Jaramillo, and Mr. Perry

I. Algebraic Properties

Commutative	$a+b+c=a+c+b$	Reflexive	$a+b=a+b$
Associative	$a+(b+c)=(a+b)+c$	Symmetric	If $a=b+c$ then $b+c=a$
Identity	$a+0=a$ or $a\cdot 1=a$	Transitive	If $a=b$ and $b=c$ then $a=c$
Inverse	$a+(-a)=0$ or $a\cdot\frac{1}{a}=1$	Distributive	$a(b+c)=ab+ac$

Name the property illustrated by each equation.

1) $5(3x+y)=5(3x+1y)$

2) $7n+2n=(7+2)n$

3) $3(2x)y=(3\cdot 2)(xy)$

4) $5x\cdot(4y+3x)=5x\cdot(3x+4y)$

5) $(6+-6)y=0y$

6) $4n+0=4n$

7) $\cos(3x+5)=\cos(3x+5)$

8) $\log\left(\frac{1}{4}\cdot 4y\right)=\log y$

II. Properties of Exponents

PROPERTY		EXAMPLE
Product of Powers	$a^m\cdot a^n=a^{m+n}$	$x^4\cdot x^2=x^6$
Power of a Power	$(a^m)^n=a^{m\cdot n}$	$(x^4)^2=x^8$
Power of a Product	$(ab)^m=a^m b^n$	$(2x)^3=8x^3$
Negative Power	$a^{-n}=\frac{1}{a^n}$	$x^{-3}=\frac{1}{x^3}$
Zero Power	$a^0=1$	$4^0=1$
Quotient of Powers	$\frac{a^m}{a^n}=a^{m-n}$	$\frac{x^{10}}{x^4}=x^6$
Power of Quotient	$\left(\frac{a}{b}\right)^m=\frac{a^m}{b^m}$	$\left(\frac{x}{y}\right)^3=\frac{x^3}{y^3}$

Tutorial: http://bit.ly/2HaPdyI

Simplify each expression. Answers should be written using positive exponents.

1) $g^5\cdot g^{11}$ _____

2) $(b^6)^3$ _____

3) w^{-7} _____

4) $\frac{y^{12}}{y^8}$ _____

5) $(3x^7)(-5x^3)$ _____

6) $(-4a^5b^0c)^2$ _____

III. Order of Operations (PEMDAS)

- **P**arenthesis and other grouping symbols.
- **E**xponential expressions.
- **M**ultiplication & **D**ivision (Left to Right)
- **A**ddition & **S**ubtraction (Left to Right)

Tutorial: http://bit.ly/2YeWKU3

Simplify each numerical expression.

1) $6 + 2 \times 8 - 12 + 9 \div 3$

2) $25 - (2^3 + 5 \times 2 - 3)$

3) $5 - 3(20 \div 4) + 6^2(3)$

4) $\frac{-2 \cdot (-30) + 0.5 \cdot 20}{4^2 - 6}$

5) $\frac{15 - [8 - (2+5)]}{18 - 5^2}$

6) $\frac{14 - 2|13 - 21|}{-4^2}$

IV. Evaluating Algebraic Expressions

- **Substitute the given value(s) of the variable(s).**
- **Use order of operations to find the value of the resulting numerical expression.**

Tutorial: http://bit.ly/2Ju5fX9

Evaluate each expression.

1) $x\left(\frac{y}{2} + 3z^2\right) - 2x$ if $x = \frac{1}{2},\ y = 4,\ z = -2$

2) $12a - 4a^2 + 7a^3$ if $a = -3$

3) $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$ if $a = 1,\ b = -4,\ c = -21$

4) $15\left(-\frac{1}{3}\right)^x$ if $x = 3$

5) $\frac{3(x+y) - 2(x-y)}{5x+y}$ if $x = 3,\ y = 4$

V. Fraction Operations

Tutorials: Adding and Subtracting Fractions: http://bit.ly/2DWlj0o
Multiplying Fractions: http://bit.ly/2vTWopv
Dividing Fractions: http://bit.ly/2DVfMac

Evaluate each of the following.

1) $\frac{2}{5}+\frac{2}{3}$

2) $\frac{3}{4}-\frac{1}{6}$

3) $5\cdot\frac{7}{3}$

4) $\frac{10}{9}\div\frac{55}{3}$

5) $\left(\frac{23}{8}-\frac{1}{2}\right)\div\left(\frac{1}{2}\right)^2$

6) $\frac{5}{7}\cdot\left[\left(\frac{1}{3}\right)^2-\frac{3}{4}\right]$

VI. Simplifying Radicals

An expression under a radical sign is in simplest radical form when:

1) there is no integer under the radical sign with a perfect square factor,
2) there are no fractions under the radical sign,
3) there are no radicals in the denominator

Tutorial: http://bit.ly/2YfsM25

Express the following in simplest radical form.

1) $\sqrt{50}$

2) $\sqrt{192}$

3) $\sqrt{169}$

4) $\sqrt{\frac{13}{49}}$

VII. Operations With Polynomials

Tutorials: Polynomials (adding & subtracting): http://bit.ly/2H7XQLs
Polynomials (multiplying): http://bit.ly/2J9YmLp

Perform the indicated operations and simplify.

1) $(7x^2+4x-3)-(-5x^2-3x+2)$

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

3) $(5x-6)^2$

4) $(n^2+5n+3)+(2n^2+8n+8)$

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

6) $-2x(5x+11)$

VIII. Factoring Polynomials

- **Always factor out GCF first**
- **Look for difference of squares**
- **Factor trinomials using Algebra 1 techniques**

Examples:

Factoring out the GCF	Difference of Squares	Trinomial
a) $6x^2 + 21x$	b) $x^2 - 64$	c) $3x^2 + 7x + 2$
$3x(2x + 7)$	$(x - 8)(x + 8)$	$(3x + 1)(x + 2)$

Tutorials: Factoring out GCF's: http://bit.ly/2HaI3f2
Factoring Difference of Perfect Squares: http://bit.ly/2JcHKlW
Factoring trinomials: http://bit.ly/2Haqk6h

Factor Completely.

1) $16y^2 + 8y$

2) $18x^2 - 12x$

3) $6m^2 - 32m + 10$

4) $6y^2 - 13y - 5$

5) $20x^2 + 31x - 7$

6) $12x^2 + 23x + 10$

7) $x^2 - 2x - 63$

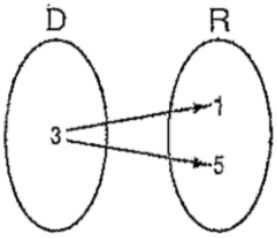
8) $8x^2 - 6x - 9$

9) $x^2 - 121$

IX. Functions

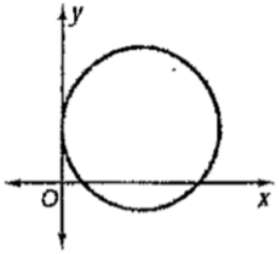
Tutorial: http://bit.ly/2H8tdo6

Determine whether each relation is a function. Write yes or no.

1) 

2)

x	y
1	2
2	4
3	6

3) 

State the domain and range of each relation. Then, determine if each relation is a function.

1) $\{(2,-3),(2,4),(2,-1)\}$ 2) $\{(2,6),\ (6,2)\}$ 3) $\{(-3,4),\ (-2,4),\ (-1,-1),\ (3,-1)\}$

Find each value if $f(x) = 2x - 1$ and $g(x) = 2 - x^2$.

1) $f(0)$ 2) $g(4)$ 3) $f(b+1)$ 4) $g(a-4)$

X. Solving Linear Equations

Tutorial: http://bit.ly/2YiCe52

Solve each equation.

1) $2[x + 3(x-1)] = 18$ 2) $6(y+2) - 4 = 10$ 3) $2x^2 = 50$

4) $5 + 2(k+4) = 5(k-3) + 10$ 5) $6 + 2w(w-3) = 2w^2$ 6) $\frac{2}{3}x - 18 = \frac{x}{6}$

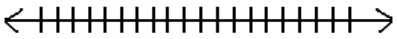
7) $4(x+1) - 1 = 2(x-5) + 2x + 5$ 8) $2[3(x+1) - 2] = 6x + 2$

XI. Solving Inequalities

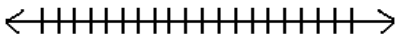
Tutorials: Linear Inequalities: http://bit.ly/2vPI7ui
Compound Inequalities: http://bit.ly/2LuMi9r

Solve and graph each inequality.

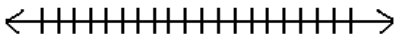
1) $8x - 6 \geq 10$



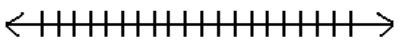
2) $-16 - 8x \geq 0$



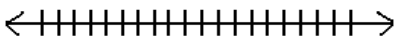
3) $9x - 11 > 6x - 9$



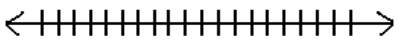
4) $9(2x - 5) - 3 < 7x - 4$



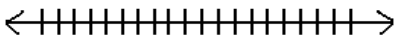
5) $-36 - 2(x + 77) > -4(2x + 52)$



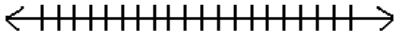
6) $12 < x + 3$ or $-5 \leq 1 - x$



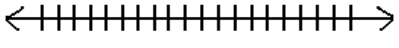
7) $14 < 5 - 3x \leq 53$



8) $3x - 13 < -4$ or $7 - 2x \leq 5$



9) $52 < 4 - 3x < 13$



XII. Linear Equations in Two Variables

- **Slope Formula:** $\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1}$
- **Graph by putting equations in $y = mx + b$ form or by finding intercepts.**
- **For an x-intercept, substitute 0 for y. For a y-intercept, substitute 0 for x.**
- **Parallel lines have the same slope.**
- **Perpendicular lines have negative reciprocal slopes.**

Tutorials: Graphing Lines: http://bit.ly/2VejbH4
Writing linear equations from two points: http://bit.ly/2H7WG2y
Writing linear equations with parallel or perpendicular lines: http://bit.ly/2PXmKk0

Find the slope of each line.

1) Through $(3, -4)$ and $(-4, 6)$

2) Through $(-4, -6)$ and $(-4, -8)$

3) $6x - 10y = -1$

4) $x = -2$

5) $y = 1$

Write an equation, in slope-intercept form using the given information.

1) $(5, 4)$ $m = -\frac{2}{3}$

2) $(-2, 4)$ $m = -3$

3) $(-6, -3)$ $(-2, -5)$

4) Parallel to $2x - 3y = 6$ and passing through $(-2, 5)$

5) Perpendicular to $y = -2x + 6$ and passing through $(-4, 2)$

Find the x and y intercepts of each line.

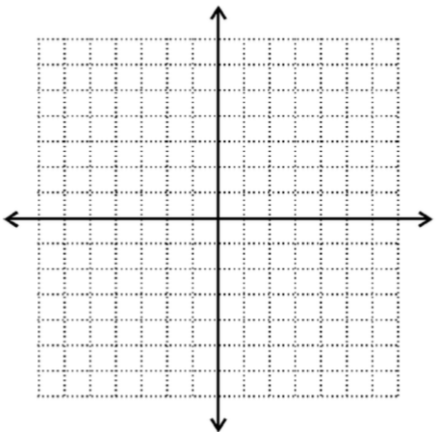
1) $10x - 4y = -20$

2) $y = 2x + 3$

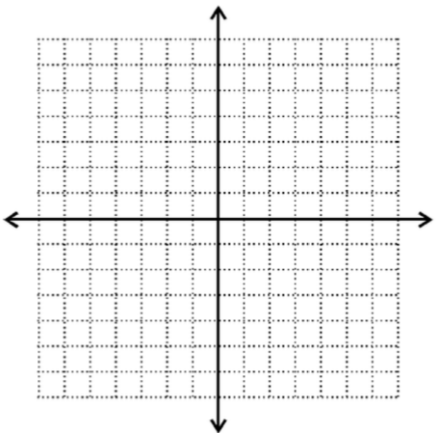
3) $x = 3$

Graph each line.

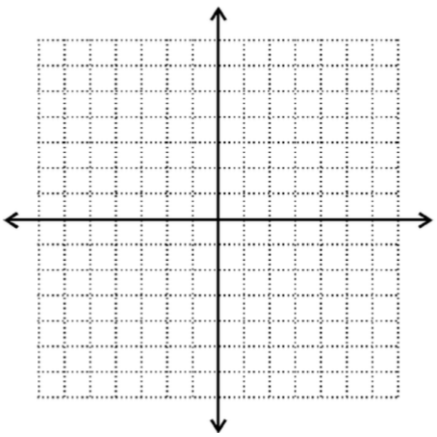
1) $y = \frac{1}{5}x - 5$



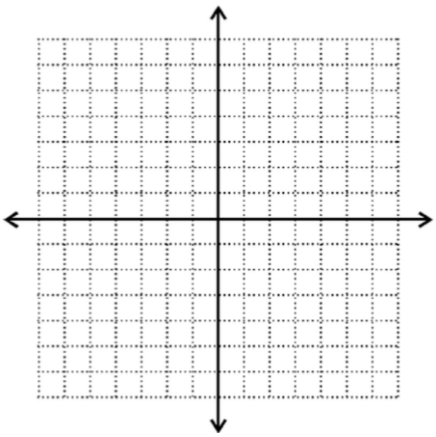
2) $y = -\frac{3}{2}x + 5$



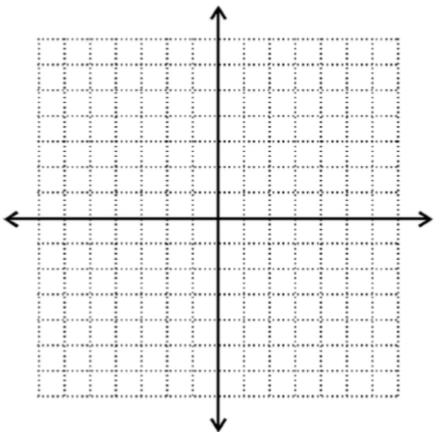
3) $4x - y = -2$



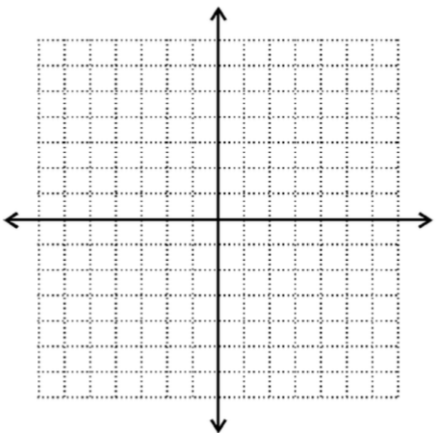
4) $3x - 8y + 24 = 0$



5) $y = -3x$



6) $3y = 12$



XIII. Solving Systems of Equations

Tutorials: Solving Systems using Substitution: http://bit.ly/2JsQmnR
Solving Systems using Elimination: http://bit.ly/2LvJEAf

Solve each system of equations by either the substitution method or elimination method. Write your answer as an ordered pair.

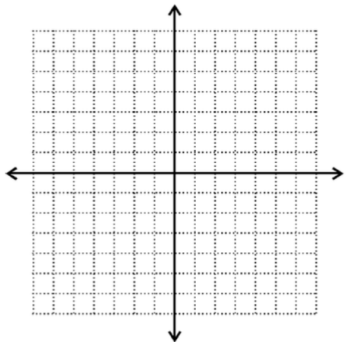
1) $y = 2x + 4$
$-3x + y = -9$

2) $3x + 7y = -1$
$6x + 7y = 0$

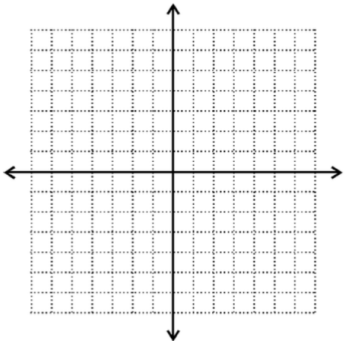
3) $4x - 6y = 20$
$y = \frac{2}{3}x - \frac{10}{3}$

Solve each system of equations by graphing.

1) $2x + 3y = 6$
$-x + 3y = -12$



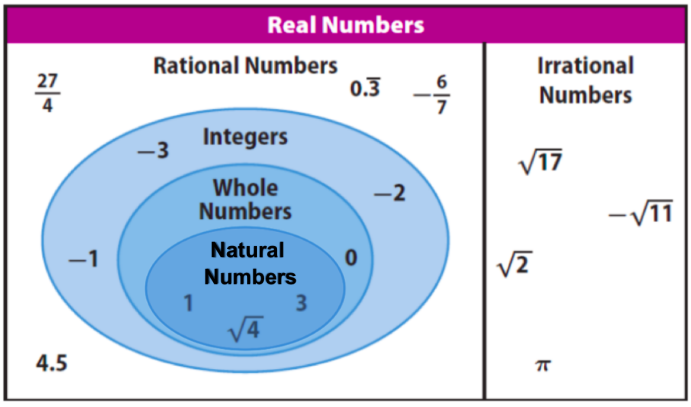
2) $2x + 3y = 18$
$5x - 3y = 3$



3) Is (11, 3) a solution to the system below?

$x - 2y = 5$
$3x - 5y = 8$

XIV. Sets of Numbers



Name all sets of numbers to which each number belongs.

1) 6425

2) $\sqrt{7}$

3) $-\frac{2\pi}{3}$

4) 0

5) $-\sqrt{16}$

6) -31.8