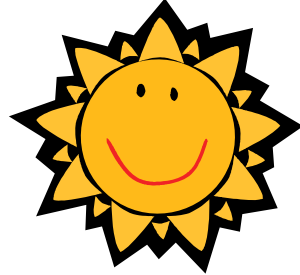


Name _____

Precalculus Honors Summer Packet 2009

Welcome to Precalculus Honors! Many students are surprised to find out how intense Precalc Honors is! It's not an SOL class, and it's not an AP class, BUT....many students tell us that it takes as much time & effort as an AP class. To make things a little easier on you in the fall, we've made this summer packet. We expect you to have mastered the skills you have learned in Algebra I, Geometry and Algebra II. If you are struggling to do basic algebra, then you will not be able to adequately concentrate on learning the new skills in Precalc. This packet highlights some of the areas that we have identified as problematic (and necessary) for our Precalc Hon students. Any problem that you do not fully understand is a red flag! Don't just blow it off! Make sure you know how to get the answer and make sure you understand the process. Bring this packet, completely finished to the first day of class. You will be getting credit for doing this work. See you in September!

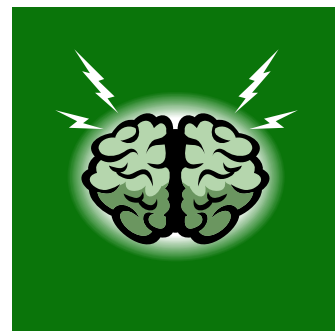
Mrs. Orazen & Mr. Ingrassia
Precalculus Honors teachers



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Section A: Solving equations

Solve each equation for x unless stated otherwise. Show ALL work. Step by step! Put a box around your final answer.

1. Solve for y : $x = \frac{y}{y-1}$

2. $\sqrt{2x^2+5} = x-6$

3. $(2x-1)^2 = 6$

4. $50x^2 - 18 = 0$

5. $3x^2 - x + 7 = 4 - 4x$

6. $\frac{3x}{4} + 6 = \frac{x-5}{12} - \frac{x^2}{3}$

Section B: Quadratic Equations

A quadratic equation in standard form looks like: _____.

When graphed, quadratics have a shape called a _____, which opens _____ if _____ and opens _____ if _____.

The v _____ is the _____ of the function if it opens up and the _____ of the function if it opens down.

Quadratics can also be written in _____ form, which looks like: _____, where _____ is the shift in the x-direction and _____ is the shift in the y-direction.

This form is helpful when it comes to _____ the equation.

_____ is called the discriminant and this helps you to know how many _____ the quadratic equation has.

It will have 2 real solutions if _____,
1 real solution if _____,
and zero real solutions if _____.

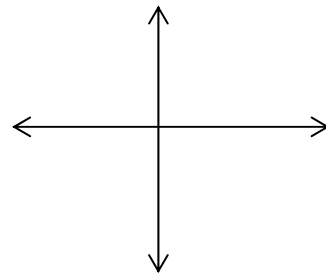
Label the following on the graph at the right:

“A” the vertex

“B” the axis of symmetry

“C” the solutions/roots

“D” the parabola



The vertex can be found algebraically using the equation _____ to find the x-coordinate, and then subbing that back into the equation to find the y-coordinate. You can find the vertex on the calc by pressing the buttons: _____, _____, _____, _____, _____, _____.

There are 5 ways to solve a quadratic equation:

- (1) F _____
- (2) Q _____
- (3) G _____
- (4) C _____
- (5) I _____

(1) When solving by f _____, you must _____ the quadratic and then set each _____ equal to zero, and then solve.

(2) ANY QUADRATIC can be solved using Q _____, which is:

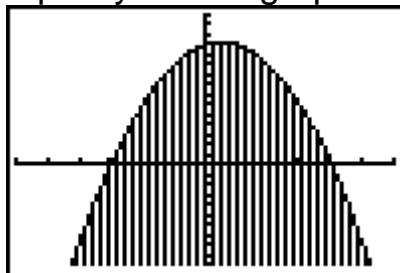
where a, b and c are the a,b,c from standard form.

(3) G _____ isn't always practical, but can be done on the graphing calculator. To find the solutions on the graphing calc, press these buttons: _____ _____ then _____, _____, _____.

(4) C _____ isn't the most common way to solve a quadratic, but it's easy if you're already used to putting a quadratic in _____ form. After that, just solve for x.

(5) When there is no _____ term in the quadratic (in other words, $b=0$), you simply solve by isolating x. It would be a waste of time to use _____ on a problem like this!!!!

Write the inequality for the graph shown:



```
WINDOW
Xmin=-6
Xmax=6
Xscl=1
Ymin=-10
Ymax=15
Yscl=1
Xres=1
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Section C: Inverse Functions

1. Name three pairs of types of functions (not specific equations) that are inverses of each other:

a. _____ & _____

b. _____ & _____

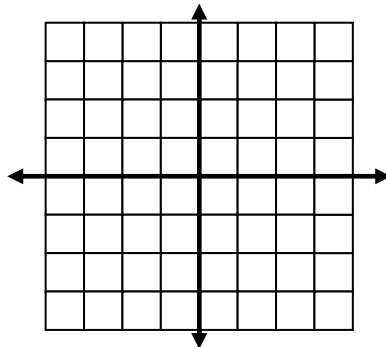
c. _____ & _____

2. Explain how you find an inverse algebraically:

Now use that method to find the inverse of $y = \frac{3}{4}x - \frac{5}{4}$

3. Explain how you find an inverse graphically:

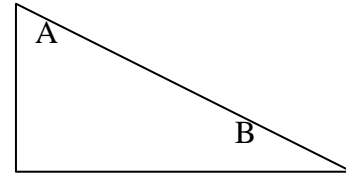
Now use that method to draw the inverse of the following function:



4. IMPORTANT CONCEPT: The expression $\left(\frac{1}{2}\right)^{-1}$ means take the _____ of $\frac{1}{2}$, BUT the expression $f^{-1}(x)$ DOES NOT mean to take the _____ of $f(x)$. It means find the _____ of $f(x)$. They are NOT the same thing!!!!

Section D: Trigonometry

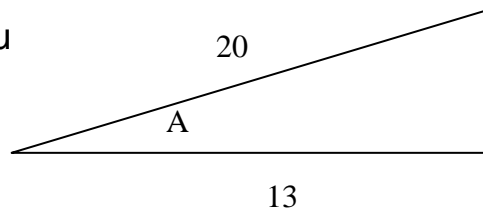
1. Write the three main trig ratios (from both acute angles) for the triangle shown:



2. In the equation $\sin x = \frac{3}{17}$, x represents what? _____

Write down the sequence of buttons that you must push on your calculator to solve for x :

3. Write an equation to help you find angle A . Then solve it.



Section E: Logic

Given: p : "If I don't study" and q : "I will be confused"

1. Write out fully the sentence represented by the symbolic notation $p \rightarrow q$:
2. Write the sentence and the symbolic notation for the CONVERSE.

3. Write the sentence and the symbolic notation for the INVERSE.

4. Write the sentence and the symbolic notation for the CONTRAPOSITIVE.

5. Assuming that the original statement $p \rightarrow q$ is true, which other statements are guaranteed to be true?

6. Make a Venn diagram with the following different types of numbers: Real, Imaginary, Rational, Irrational, Integers

Section F: Rational Expressions

Show all work. Neatly!

1. Simplify $\frac{5x-3}{5x}$

2. Subtract $\frac{x-5y}{x+y} - \frac{2x-3y}{x+y}$

3. Add $\frac{x-1}{3x+15} + \frac{x+3}{5x+25}$

4. Simplify $\frac{y + \frac{1}{2}}{y - \frac{1}{7}}$

5. Simplify $\frac{\frac{4}{x-5} + \frac{2}{x+2}}{\frac{2x}{x^2-3x-10} + \frac{3}{x-5}}$

6. Divide $\frac{x^3-64}{x^3+64} \div \frac{x^2-16}{x^2-4x+16}$

Section G: Factoring

Factor completely.

1. $ab + mb - xb$

2. $17 - 51y^2$

3. $20k^3a^2 - 16k^2a^3$

4. $3m^3 + 9m^2 + 8m + 24$

5. $9x^2 + 15x + 4$

6. $125c^6 - 8d^6$

7. Write the factoring pattern for a Difference of Two Squares. **Also**, show a specific example.

8. Write the factoring pattern for a Sum of Two Cubes. **Also** show a specific example.

9. Write the factoring pattern for a Difference of Two Cubes. **Also** show a specific example.

10. Write the expansion of a Binomial Squared.

11. Write the expansion of a Binomial Cubed.

12. Write the first seven lines of Pascal's Triangle.

13. Use Pascal's Triangle to expand $(x + y)^5$ (without doing any FOIL-ing!)

Section H: Simplifying Expressions

Simplify.

1. $\frac{2}{(5x)^{-3}}$

2. $\frac{a^2b^{-2}c}{a^5b^{-5}c^{-3}}$

3. $\left[\frac{(-3x^2y^5)^{-3}}{(2x^4y^{-8})^{-2}} \right]^2$

4. $\frac{p^2 - 25}{p^2 + 10p + 25}$

Section I: Forms of Linear Equations

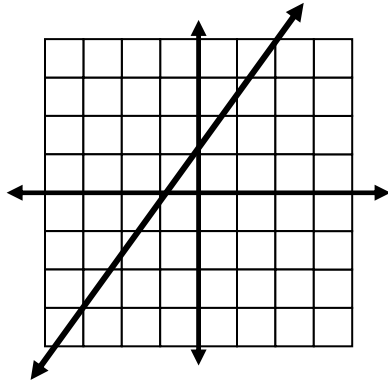
1. The three forms of a linear equation are:

(a) S _____ which looks like: _____

(b) P _____ which looks like: _____

(c) S _____ which looks like: _____

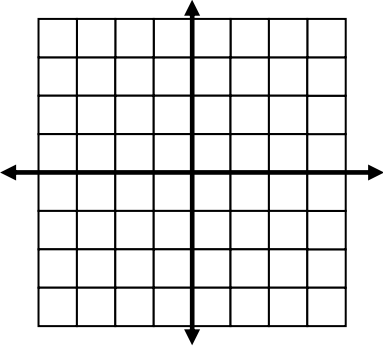
2. Look at the graph below:

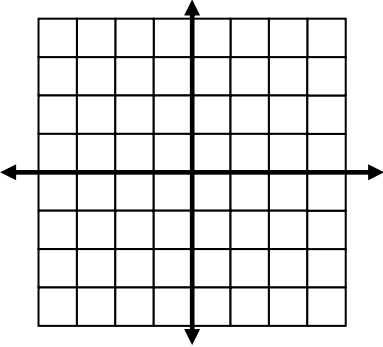


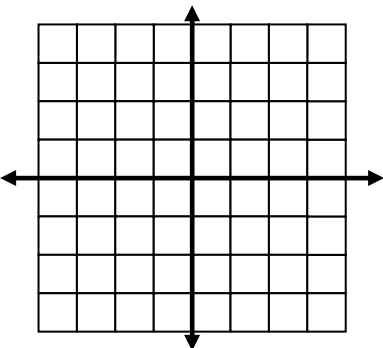
Write the equation of the line ALL 3 of the ways listed above. Show work. Box each different form and label.

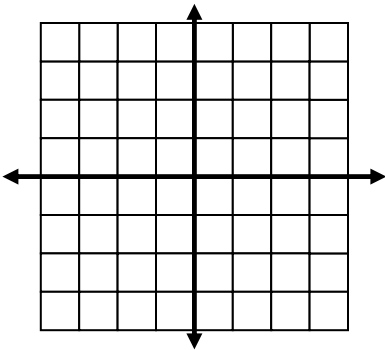
3. Write the equation of a line that passes through the points $(-7, 6)$ and $(3, -2)$. Show all work.

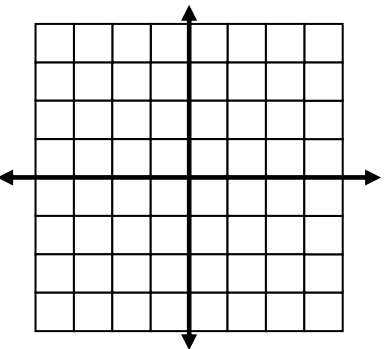
Section J: Basic Functions

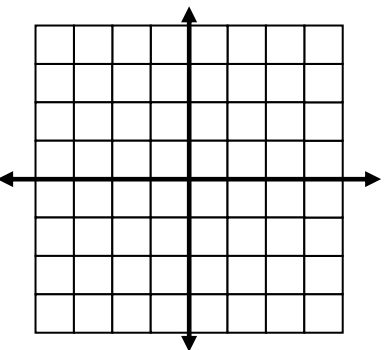
<p>Function: 1.</p> $f(x) = \frac{1}{2}(x-2)^2 + 1$	<p>Graph it:</p> 	<p>What KIND of function is it?</p>
<p>Describe the transformation(s) in words:</p>		<p>Domain:</p> <p>Range:</p>

<p>Function: 2.</p> $f(x) = (x+1)^3 - 2$	<p>Graph it:</p> 	<p>What KIND of function is it?</p>
<p>Describe the transformation(s) in words:</p>		<p>Domain:</p> <p>Range:</p>

<p>Function: 3.</p> $f(x) = \sqrt{x-4} - 2$	<p>Graph it:</p> 	<p>What KIND of function is it?</p>
<p>Describe the transformation(s) in words:</p>		<p>Domain:</p> <p>Range:</p>

<p>Function: 4. $f(x) = (x+3)(x+1)(x-2)$</p>	<p>Graph it:</p> 	<p>What KIND of function is it?</p> <p>Domain:</p> <p>Range:</p>
<p>Describe the transformation(s) in words:</p>		

<p>Function: 5. $f(x) = -2 x-1 +2$</p>	<p>Graph it:</p> 	<p>What KIND of function is it?</p> <p>Domain:</p> <p>Range:</p>
<p>Describe the transformation(s) in words:</p>		

<p>Function: 6. $f(x) = \frac{1}{x}$</p>	<p>Graph it:</p> 	<p>What KIND of function is it?</p> <p>Domain:</p> <p>Range:</p>
<p>Describe the transformation(s) in words:</p>		

Now you should be ready for Precalculus Honors!
See you in September!