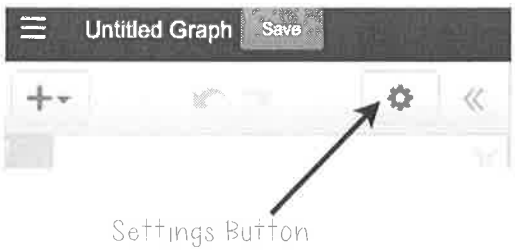
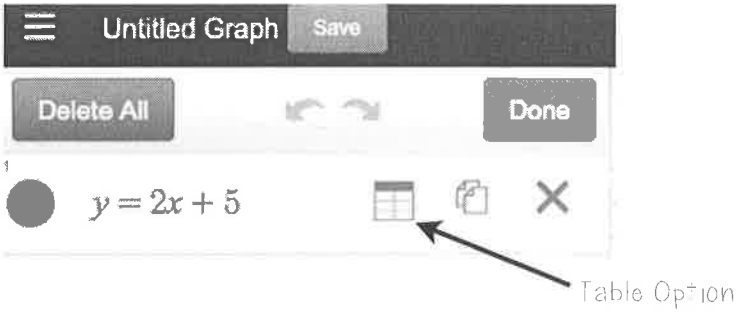
Name:_____Class:_____Date:_____

PreAP Algebra 2 Inverse Equations Activity using Desmos.com

Using a computer/ipad/chromebook/whatever... go to desmos.com and put $y = x$ in the first entry. Use graph paper to record the <u>first and final equations</u> in each problem set as you go.

1. Enter $y = 2x + 5$ in the second entry. The graph should appear.
2. Go to the settings button, and select the table option. Your equation should now be in table form.





3. Copy the table here:

x	y = 2x + 5

4. Using your geometry knowledge (you are all geometry graduates!), reflect the points over the line $y = x$, by switching the x and y values in the ordered pairs. Fill in the table at the right with the new ordered pairs.

{geometry rule to reflect over the line $y = x$: $(x, y) \rightarrow (y, x)$}

We will call the new equation **"the mystery EQ"**.

[cue scary music]

x	the mystery EQ

5. Graph your points for **the mystery equation** in the third entry by typing in the ordered pairs using appropriate spacing and commas between each ordered pair like this: (x, y), (x, y), (x, y), ... obviously yours will be numbers and not x's and y's.

6. Using the original equation from #1, rewrite it by swapping places with x and y. Type that equation into the fourth entry (it should start with "x = "). If you did it correctly, it will connect your points for on the graph. Write the " switched" equation here:

7. Remember how to write the equation of a line from Algebra 1 or Geometry? (good luck!) Use two points from **the mystery equation** table to write **the mystery equation**. Type this equation in the fifth entry. If you found it correctly, it should graph on top of the equation you found in #6. You should see a color change on your line.

8. Follow directions #1-#7 but use this equation $y = 1/2x - 4$ as the second entry. Delete all other entries except $y = x$. Don't forget to record your first and final graphs on graph paper. Show all of your new equations and work here:

x	y = 1/2x - 4

x	the mystery EQ

*Before you move on to #9, please explain, in words, how you could have used the equation in #6, the "switched equation", to get the same equation you found in #7?? You have two sets of equations from which to figure out the answer. You will need this answer to help you later, so don't skip it!

9. Now let's get tricky. Keep the $y = x$, but use $y = x^2 - 3$ as your equation in the second entry (delete all other entries) and follow the directions starting with #10. Be sure to record your first and final graphs on graph paper.

10. Choose points on the graph by touching the screen or however you do that on the device you are using. Be sure to choose strategic points to make the complete shape. Record here ☞

Make the table for **the mystery equation** by switching the x and y values. Graph **the mystery equation** points by putting the new ordered pairs in the third entry appropriately.

x	$y = x^2 - 3$

x	the mystery EQ

11. What equation would you use to connect the points? (think about what you did in #6). Enter that equation in the fourth entry and see if you did it correctly. It should connect your points. Write that equation here:

12. Since this is clearly NOT a linear EQ, and you don't know enough Algebra 2 to write the equation of **the mystery equation** from the points in your table, how can you find **the mystery equation**??? Good thinking, now FIND IT! Show your work, please and thank you.

13. Now that you have figured out **the mystery equation**, put it in desmos. Be careful here! Think about how you have to enter it in desmos to see the whole graph.

14. Did your **mystery equation** graph over the "switched" equation you used for #11? This is the only way you will know if you did it correctly. :)

15. Now do the same for these two trickier equations by following directions #9 - #14. There are additional questions for each equation given below; read them so you can anticipate what will happen. Be sure to record your first and final graphs on graph paper. Show all of your work and new equations.

a. $y = \sqrt{(x + 2)}$

How can you make **the mystery equation** you found <u>exactly fit</u> the graph made with the "switched " equation?? Use desmos to verify your theory.

x	$y = \sqrt{(x + 2)}$

x	the mystery EQ

It is possible that you may not need all of the rows in the table, but don't skimp on choosing points either.

b. $y = |x - 1|$ This is a tricky one! See your notes from around September 1 if you get stuck.

x	$y = \|x - 1\|$

x	the mystery EQ

How can you make **the mystery equation** you found <u>exactly fit</u> the graph made with the "switched " equation?? Use desmos to verify your theory.