Introduction to the Discriminant – **Name:**_____

Studying Solution Types of a Quadratic Equation **Date:**_____

Important- Set one side equal to zero before identifying a, b and c.

Recall: **The Quadratic Equation**

The solutions to any quadratic equation of the form $ax^2+bx+c=0$ where $a \neq 0$

are given by $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

Part of this formula can be used to provide us with a quick overview of the types of solutions a quadratic equation has. "This part" is called the **discriminant**. It is the part under the radical, namely the $\boldsymbol{b^2-4ac}$ part. As you will see, it is interesting!

Part I: To gain a better understanding of quadratic equations, the quadratic formula and the graphically representation of the solution, complete the following exercises.

As you complete each exercise, consider the numerical value of the discriminant ($\boldsymbol{b^2-4ac}$).

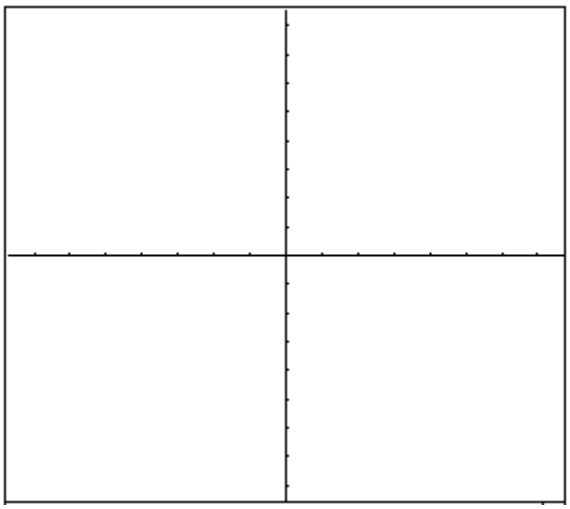
1. Solve using the Quadratic Formula: $\boldsymbol{x^2-5x+6=0}$

   Use the ClassPad to graph $\boldsymbol{y=x^2-5x+6}$ and sketch its graph below.

   Complete: a= b= c=

   Write Formula:

   Show Work:



Be sure to label the axis.

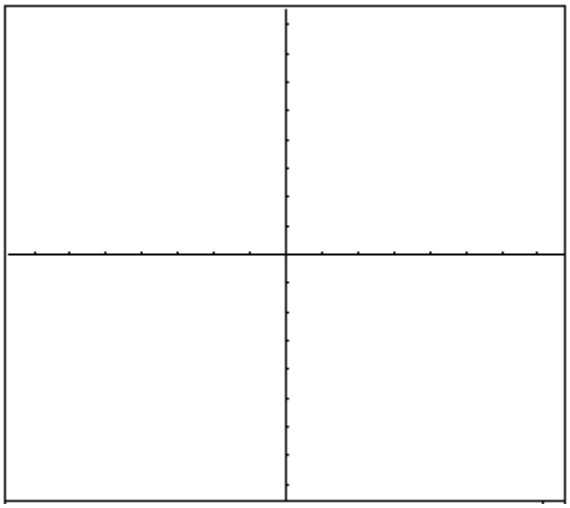
2. Solve using the Quadratic Formula:
$2x^2+1=3x$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y=2x^2-3x+1$ and sketch its graph below:



Be sure to label the axis.

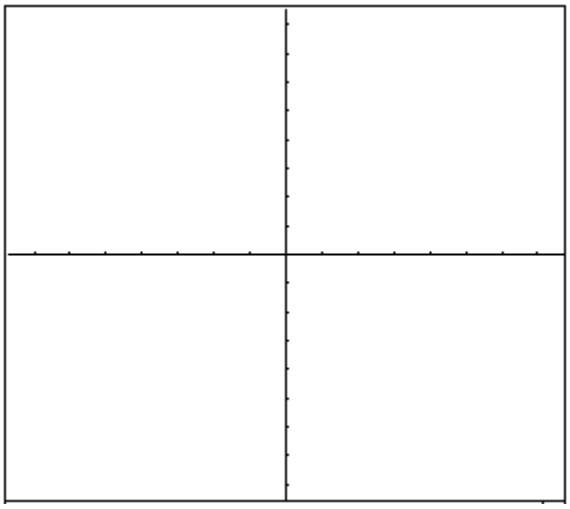
3. Solve using the Quadratic Formula:
$-x^2+4x-4=0$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y=-x^2+4x-4$ and sketch its graph below:



Be sure to label the axis.

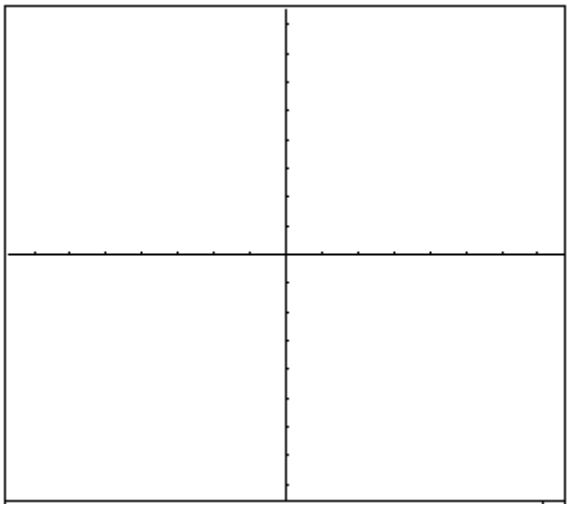
4. Solve using the Quadratic Formula:
$4x^2 - 12x = -9$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y = 4x^2 - 12x + 9$ and sketch its graph below:



Be sure to label the axis.

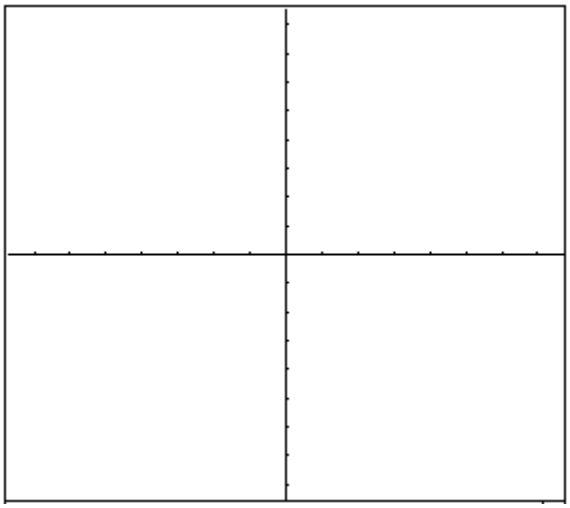
5. Solve using the Quadratic Formula:
$x^2 + 1 = 0$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y = x^2 + 1$ and sketch its graph below:



Be sure to label the axis.

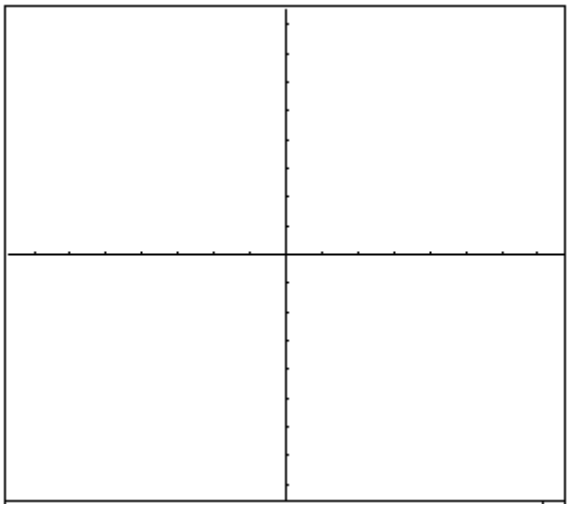
6. Solve using the Quadratic Formula:
$-2x^2+4x=3$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y=-2x^2+4x-3$ and $y=2x^2-4x+3$; sketch the graphs below:



Be sure to label the axis.

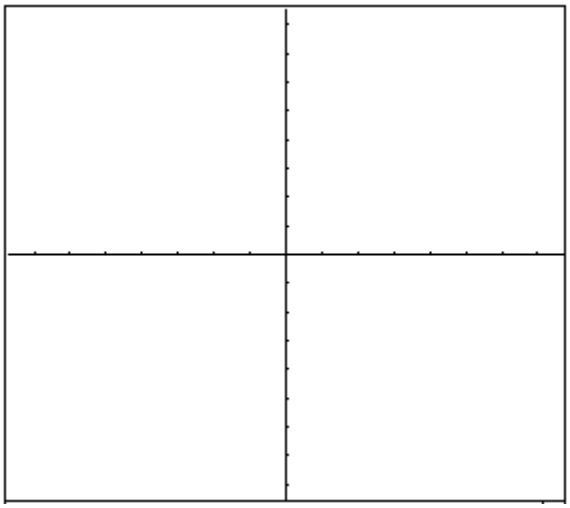
7. Solve using the Quadratic Formula:
$-3x^2-4x=-1$

Complete: a= b= c=

Write Formula:

Show Work:

Use the ClassPad to graph $y=-3x^2-4x+1$ and $y=3x^2+4x-1$ sketch the graphs below:



Be sure to label the axis.

8. Based on your results from exercises 1-7, complete the following:

   If $b^2 - 4ac > 0$, then there are _____ real solution/s.

   If $b^2 - 4ac = 0$, then there are _____ real solution/s.

   If $b^2 - 4ac < 0$, then there are _____ real solution/s.

9. Will the graph of $y = 2x^2 - x + 3$ cross the x-axis? Explain how you can quickly answer this question.

10. Can you factor $3x^2 - 2x - 1$? Explain how the discriminant can be used to quickly decide.

11. Complete the following table:

Quadratic Equation	Discriminant Value	Number of Real Solutions
$4 = x^2 - x$		
$2x^2 = -x - 5$		
$9y^2 = -6y - 1$		