

Number Sense, Quadratics, Matrices Review Day 1

Name _____

Warm Up:

1. What are the zeroes of the quadratic function $f(x) = x^2 + 3x + 1$?
2. Sketch the solution set to $x^2 - 6x + 7 \leq 2x - 5$?
3. For the equation $x^2 - 4x + 4 = 9$, determine the number and types of roots.
4. Given the equation: $(x - 2)^2 + (y - 4)^2 = 25$ name the center and radius of the circle.
5. Given the equation: $(x - 2)^2 + (y - 4)^2 = 25$ sketch a graph of the circle.

Guide Notes:

Solve Quadratic Equations

When solving quadratic equations and inequalities, always make sure the equation is set _____.
_____ the equation if possible. Factoring is looking for what _____ to get the original problem.

Example: $x^2 + 9x + 18 = 0$

*Remember: Multiply a and c;
look for factors that add to b.*

If quadratic equation cannot be _____, use _____.

Quadratic Formula:

*Equation must be in
standard form and set equal
to 0. ($ax^2 + bx + c = 0$)*

You should now be able to do #1 from warm up.

Remember when solving quadratics: If there is a _____ number under the radical you have _____
_____. Complex (Imaginary) Roots come in _____!!! They will have the
_____ real number, _____ sign on the complex (imaginary) piece.

Graphing Quadratic Inequalities

Can also be solved by graphing the inequality on a coordinate plane.

Example: Graph $y < -2x^2 + 4$.

Change the inequality to an equality: _____

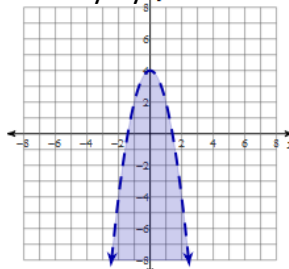
Graph the equation (find vertex _____, then find y by substituting x into equation)

$$y < -2x^2 + 4$$

< or \leq shade _____

> or \geq shade _____

You should be able to do #2 from the warm up.

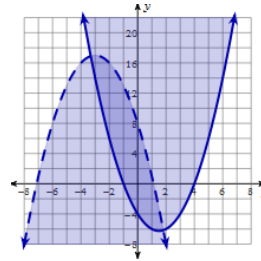


When solving a system of quadratic inequalities, _____ both quadratic functions and look for the areas of _____

Example: What is the solution to the system of inequalities?

$$y \geq x^2 - 3x - 4$$

$$y < -x^2 - 6x + 8$$



Determining the Number and Type of Roots

To do this, use the _____ of the quadratic formula: Discriminant:

Discriminant	Roots
$D < 0$	_____
$D = 0$	_____
$D > 0$	_____

You should now be able to do #3 from warm up.

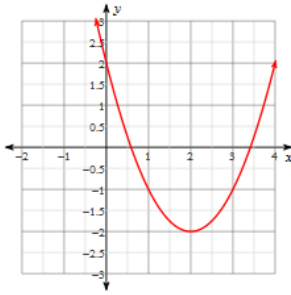
Domain and Range of Quadratic Functions

The _____ of a quadratic function is all the _____ that lie on the function in the graph from the _____ x value to the _____ x value.

The _____ is all of the _____ that lie on the function in the graph from the _____ y value to the _____ y value.

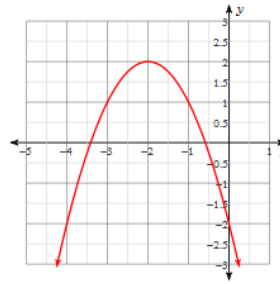
Examples:

1) $y = x^2 - 4x + 2$



Domain: all x values
Range: $y \geq -2$

2) $y = -x^2 - 4x - 2$



Domain: all x values
Range: $y \leq 2$

Writing Equations Quadratic Functions

Use _____ of a quadratic equation: _____, and substitute the vertex into the equation for (h, k). Using the point given, substitute the x and y values into the equation for x and y and _____ for a. _____ the vertex form of the equation using the newly calculated a value. Simplify to get standard form _____.

Example: Write the equation of the parabola with its vertex at (15, 8) and point on the graph (7, -8)

Circles

The standard form of an equation of a circle is: _____

Where (h, k) is the center of the circle (_____). r is the _____

Example: Find the equation of the circle with the center at

(-1, 4) and a radius of 15. $(x + __)^2 + (y - __)^2 = ______$

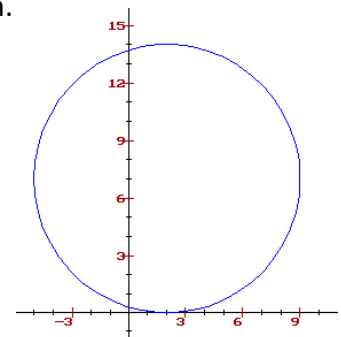
You should be able to do #4 on your warm up now.

Graphing Circles:

From the equation, find the center _____ and then the _____ (r). Plot the _____ point on a coordinate plane. Using the radius, find 4 points on the circle, then _____ the graph.

Example: The equation of a circle is $(x - 2)^2 + (y - 7)^2 = 49$. Graph the circle.

You should now be able to do #5 on your warm up.



Practice Problems:

Solve the following quadratic equations:

1. $a^2 = -10a - 21$

2. $6x^2 - 3x = 30$

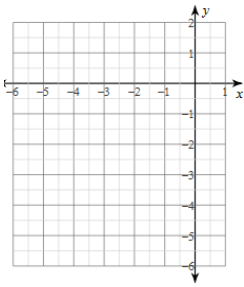
Name the type and number of roots for #3 & #4:

3. $-2n^2 + 8n - 14 = -6$

4. $9x^2 + 8x - 1 = -3$

5. Graph and name the domain and range

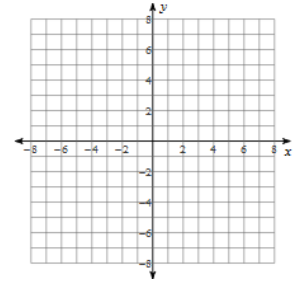
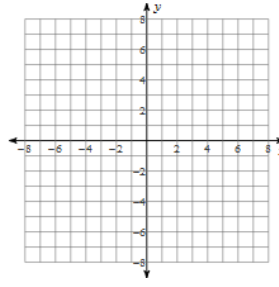
$y = x^2 + 8x + 12$



Sketch a graph of the inequality in 6 & 7

6. $y < -2x^2 + 4x$

7. $y \geq x^2 - 2x + 3$



8. Solve the quadratic.

$x^2 + 7x + 15 = 3$

9. Sketch the solution to the systems of quadratic.

$y < 2x^2 - 2x + 3$

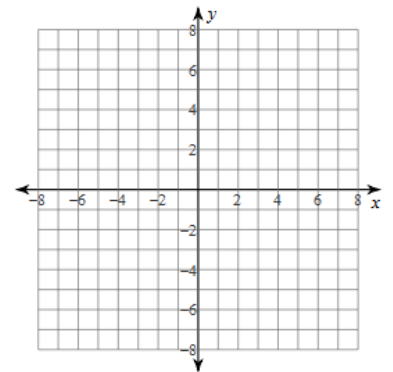
$y > -x^2 - 2x + 7$

Write the equation for the circles given in 10

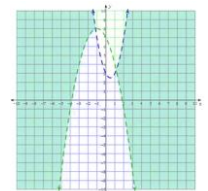
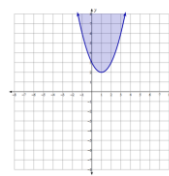
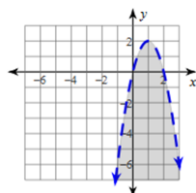
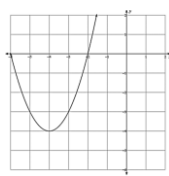
10. Center (8, -12) Radius: 6

For 11, state the center and radius. Sketch the graph.

11. $(x + 4)^2 + (y + 1)^2 = 4$



Answers: 1) $a = -7$ and $a = -3$ 2) $x = 5/2, x = -2$ 3) 1 real solution 4) 2 imaginary solutions



5) D: all x values R: $y \geq -4$

6)

7)

8) $x = -4, x = -3$

9.

10) $(x - 8)^2 + (y + 12)^2 = 36$

11) circle with a center at $(-4, -1)$ and a radius of 2