Final Exam Review **Name _________________________**

Quadratic Equations

1. **Standard Form: _________________________**

   The y-intercept is always (0, _____). The axis of symmetry is x = ___________

   Make up a quadratic equation in standard form and find the y-intercept and the axis of symmetry.

   ____

2. **Vertex Form: __________________________**

   The vertex is always (_____, ______)

   Make up a quadratic equation in vertex form and find the vertex.

   ____

3. **Intercept Form: __________________________**

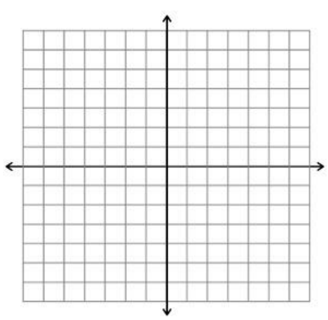
   The x-intercepts are always (_____, 0) and (_______, 0)

   Make up a quadratic equation in intercept form and find the x-intercepts.

   ____

4. **Parent Function y = x^2**

   Graph:

   Characteristic Points:

5. **Transformations:** $y = a(x \pm h)^2 \pm k$

   What does h do? ____

   What does k do? ____

   What does a do? ____

   What if a was negative? ____

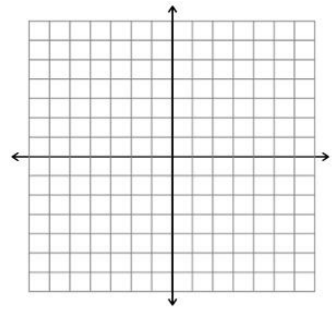
Make up your own quadratic equation:

____

Describe the transformations:

____

Graph it:



What inequality symbols are used for the following?

Dashed parabola: ______________

Solid parabola: __________________

Shade up: _______________

Shade down: ___________________

Graph each inequality.

$y > -x^2 + 2x + 1$

Standard form

vertex:

Find AOS first.

Plug AOS into equation to find y value of vertex.

Plot characteristic points up or down?

Solid or dotted?

Shade up or down?

$y \leq 2(x-2)^2 - 3$

vertex form

vertex:

Plot points up or down?

Characteristic points?

Solid or dotted?

Shade up or down?

$y \geq (x-3)(x+1)$

intercept form

x-int:

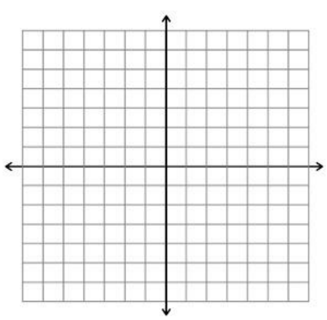
vertex:

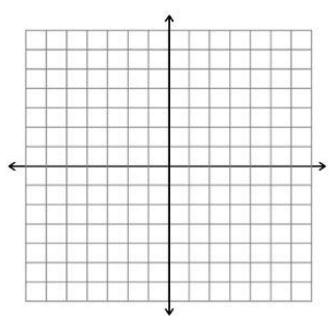
AOS is in the middle between the x-intercepts.

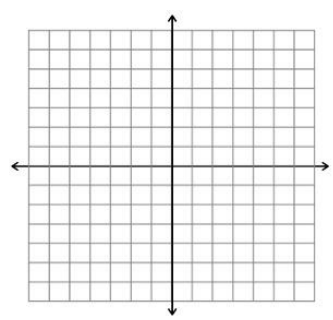
Find y value of vertex.

Plot Characteristic points up or down?

Solid or dotted? Shade up/down?



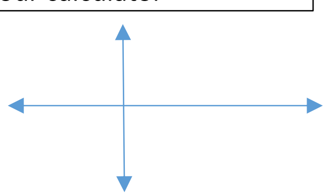




6. Solve by graphing:

1. Get equation to equal ______________
2. Enter the equation in _________ on the calculator.
3. Have the calculator find the ____________________________.

Sketch what you see on your calculator

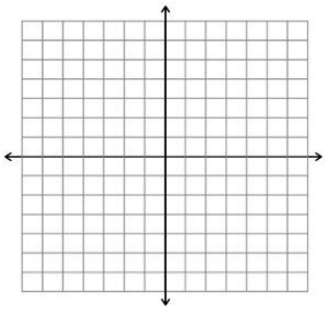


Practice: $x^2 = 10x - 21$ x = ______ or x = __________

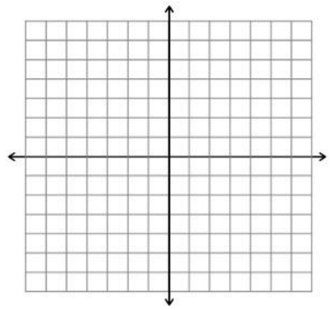
Remember a quadratic equation can have 2 real solutions, 1 real solutions or 2 imaginary solutions.

Sketch a graph that illustrates each.

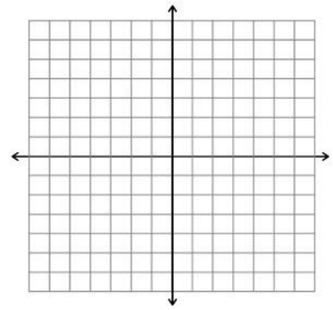
2 real solutions



1 real solution



imaginary solutions



7. **Solve by factoring:**
   1. Make sure the equation equals _______________.
   2. Divide by the __________ ____________ _____________.
   3. If it is a trinomial that starts x^2, find two numbers that ______ to get c, and _________ to get b.
   4. If it is a trinomial that starts ax^2, rewrite as _________ terms and use grouping.
   5. If it is a binomial, check that is a difference square pattern, which is ____.

$x^2 - 2x - 15 = 0$ $\qquad$ $4y^2 - 25 = 0$ $\qquad$ $2w^2 - 3w = 9$ $\qquad$ $2a^2 + 60 = -22a$

8. **Solve by square roots**: Use when there is only one x in the equation.
   1. Isolate the radical.
   2. _____________ both sides to eliminate the exponent, creating two values, one ______________ and one ________________.
   3. You will get an imaginary number when ______________________________

$3(x+4)^2 - 18 = 0$ $\qquad$ $4x^2 + 100 = 0$

9. **Solve by completing the square:** Starting with $ax^2 + bx + c = 0$

   1. Divide by a and move c to the other side.
   2. Draw a square on each side.
   3. Put ________ in each square.
   4. Rewrite the left side as ____________, and simplify the right side.
   5. Square root both side. Don't for the __________.

$x^2 - 8x - 84 = 0$ $\qquad\qquad\qquad\qquad$ $3x^2 + 6x - 12 = 0$

10. **Solve using the quadratic formula.** Make sure the equation equals ______________

The formula is x = _____________________________

$6x^2 + x - 15 = 0$ $\qquad\qquad\qquad\qquad$ $x^2 + 25 = 10x$

11. Projectile Motion:

We want to know the **<u>starting height</u>** (which is _____________________ on the graph),

the **<u>maximum height</u>** and when in occurs (which is _______________ on the graph),

and when the ball hits **<u>the ground</u>** (which is _____________________ on the graph).

- A rocket is fired into the air. Its height, in feet, is defined by the equation: $h(t) = -16t^2 + 64t + 2240$. Time is measured in seconds.

  What is the starting height? ____________

- A football is kicked into the air. Its height in meters after t seconds in given by $h(t) = -4.9(t - 2.4)^2 + 29.$

  What is the maximum height of the ball? ______ When did it reach this height? ____

- An object is launched at 19.6 from a platform. The equation for the object's height *s* at time *t* seconds after launch is *h*(*t*) = –4.9(*t*– 6)(t +2), where *s* is in meters.

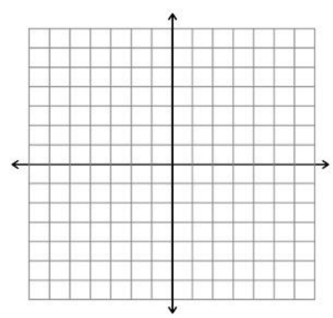
  When did the object reach the ground? _______________________

12. Systems: Graph a system of equations using your calculator.

The solutions are the _________________________

Solve with a calculator: $\begin{cases} y = -2(x+1)^2 + 1 \\ 2x + y = -3 \end{cases}$ ___________ _____________

Graph the system: $\begin{cases} y \geq (x-3)^2 - 6 \\ y > \frac{1}{2}x - 4 \end{cases}$



Parabola	Line
Vertex	y-intercept
Open up/down	slope
Characteristic pts.	
Solid/dotted	Solid/dotted
Shade up/down	Shade up /down

Name a point that is part of the solution

____