At this point you should be familiar with 2 different equations for a parabola

* The Standard Equation: 
* The Vertex Form: , where (h, k) is the turning point (vertex)

There is another equation for a parabola, we will call The General Form or Locus Form, that can be helpful when working with the focus and directrix.

**The General (Locus) equation of a Parabola**



The focus lies on the axis of symmetry *p* units (directed distance) from the vertex.

If *p* is positive, the parabola opens up, and if *p* is negative the parabola opens down.

***Exercise* #1:** The equation of a parabola in General Form is 

(a) Determine the coordinates of the vertex (b) Determine the value of *p* in the equation.

 for this parabola.

(c) Draw a sketch of the parabola, including (d) State the coordinates for the focus, and write

 the vertex, focus and directrix. the equation of the directrix.

***Exercise* #2:** For the parabola whose general equation is ,

 write the parabola in standard form.

***Exercise* #3:** Given a parabola whose focus is the point  and whose directrix is the horizontal line 

(a) Use the distance formula to determine (b) Use the general (Locus) equation to determine

 the standard equation of the parabola. the standard equation of the parabola.

***Exercise* #4:** Determine both the general equation and the standard equation of a parabola

with a focus of (0,4) and a directrix of y = 2?

The General (Locus) Equation of a Parabola

**Common Core Algebra I Homework**

**Fluency**

1. What is the vertex of the parabola whose equation is (x – 5)2 = -(y + 9)? \_\_\_\_\_\_\_\_\_\_

 (1) (-5, 9) (2) (-5, -9) (3) (5, -9) (4) (25, -9)

2. What is the focus for a parabola whose equation is (x – 2)2 = 4(y – 6)? \_\_\_\_\_\_\_\_\_\_

 (1) (2, 6) (2) (2, 7) (3) (2, 10) (4) (7, 2)

3. Which of the following is the standard equation for the parabola x2 = -4(y + 2)? \_\_\_\_\_\_\_\_\_\_

 (1)  (3) 

 (2)  (4) 

4. The parabola whose equation is  is shown graphed on the grid below. Its directrix is the *x*-axis.

Directrix

***y***

***x***

 Use the distance formula to verify that

 the point (-5, 5) is equidistant from both the

 directrix and the focus (0, 4)

5. The equation of a parabola in General Form is . Determine the coordinates of the vertex and focus, and the equation of the directrix.

6. For the parabola whose general equation is , write the parabola in standard form.

7. Write the standard equation of the parabola with focus  and directrix y = 1.

8. Complete the square to write the following parabola in vertex form and find its turning point.

 