A circle is the set of all points (x, y) in a plane equidistant from a fixed point (h, k) called the **center** of the circle. The distance, r, between the center and any point (x, y) on the circle is the **radius**.

Standard Form Equation for a circle with center (h, k) and radius r is: $(x - h)^2 + (y - k)^2 = r^2$

Find the equation of the circle containing point (1, 4) with a center at (-2, -3).
Using the distance formula: $r = \sqrt{(1+2)^2 + (4+3)^2} = \sqrt{9+49} = \sqrt{58} \rightarrow \boxed{(x + 2)^2 + (y + 3)^2 = 58}$

A parabola is the set of points (x, y) in a plane that are equidistant from a fixed line, the **directrix**, and a fixed point, the **focus**, not on the directrix. The midpoint between the focus and the directrix is the **vertex**, and the line passing through the focus and the vertex is the **axis of symmetry**.

Standard Form Equation of a parabola with horizontal directrix y = k - p is: $(x - h)^2 = 4p(y - k)$, $p \neq 0$
Standard Form Equation of a parabola with vertical directrix x = h - p is: $(y - k)^2 = 4p(x - h)$, $p \neq 0$

In each case, p is the directed distance from the vertex to the focus.

Find the standard equation of the parabola with vertex at (0, 0) and focus at (0, 4).
The axis of symmetry is vertical and the directrix is horizontal, so we get: $x^2 = 4py$ but the directed distance from the vertex to the focus is +4, p = 4 so we get: $\boxed{x^2 = 16y}$

Another form if we want y as a function of x, would be $\boxed{y = \frac{1}{16}x^2}$

Pre-Calculus Assignment 240 Wednesday, April 29, 2015 Hour Name

1. Find the equation of the circle with center $(0, 0)$ and radius $4\sqrt{2}$.

2. Find the equation of the circle with center $(5, -6)$ and diameter $4\sqrt{3}$.

3. Find the center and radius of the circle: $(x + 9)^2 + (y + 1)^2 = 36$

4. Find the center and radius of the circle: $x^2 + (y + 12)^2 = 24$

5. Write the equation of the circle in standard form: $\frac{1}{9}x^2 + \frac{1}{9}y^2 = 1$

6. Write the equation of the circle in standard form: $\frac{1}{9}x^2 + \frac{1}{9}y^2 = 1$

7. Find the Vertex, Focus, and Directrix of the parabola: $y = -4x^2$

8. Find the Vertex, Focus, and Directrix of the parabola: $(x - 5) + (y + 4)^2 = 0$

9. Find the Vertex, Focus, and Directrix of the parabola: $(x - 5) + (y + 4)^2 = 0$

10. Find the Vertex, Focus, and Directrix of the parabola: $y^2 - 4y - 4x = 0$

11. Find the standard equation for the parabola with vertex $(3, -3)$ and focus $(3, -9/4)$

12. Find the standard equation for the parabola with vertex $(2, 2)$ and directrix $x = -2$.