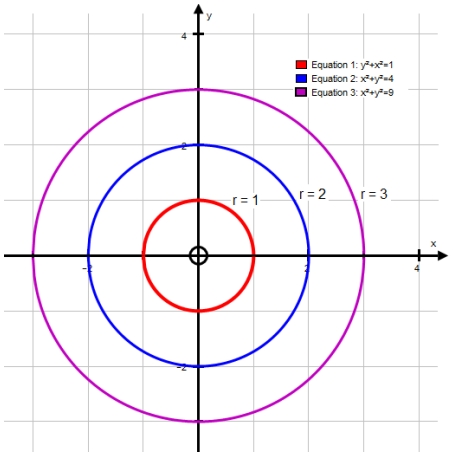
Circle

A circle is the set of all points in a plane equidistant from a fixed point called the center point. We can derive the equation directly from the distance formula. If we place the center point on the origin point, the equation of a circle with center point (0, 0) and radius r is:

$$x^2 + y^2 = r^2$$

Look at the family of circles drawn, the three circles have the same center which is the origin and their radi are 1, 2 and 3 consecutively.

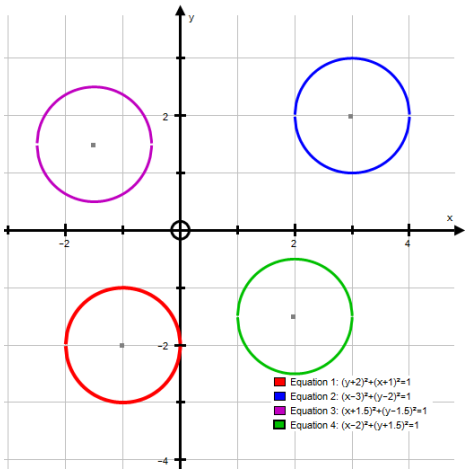


A simple translation of the circle equation that is the center is (h, k) instead of the origin O(0,0),becomes:

$$(x - h)^2 + (y - k)^2 = r^2$$

with center at (h, k) and radius r.

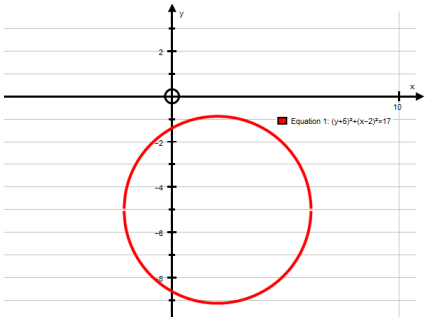
Here are the graphs of some examples:



Example 1: Find the center, radius and graph the equation: $(x - 2)^2 + (y + 5)^2 = 17$

Center point is C(2, -5)

Radius = $\sqrt{17}$



Definition 1: An equation of the second degree in which the coefficients of the x^2 and y^2 terms are equal and the xy term does not exist, represents a circle.

The equation of a circle may also be expressed in the general form: $x^2 + y^2 + Bx + Cy + D = 0$ where B, C, and D are constants.