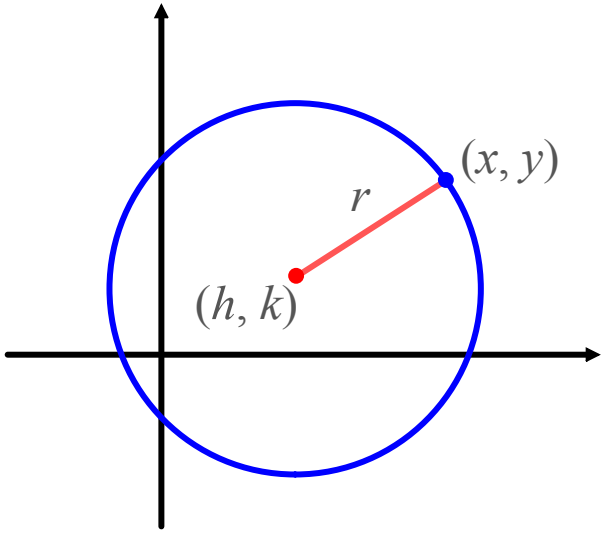
Section 1.2 Circles

A **circle** is the locus of all points in the plane equidistant from a given fixed point. The fixed point is called the *center*, and the distance is called the *radius*.



The standard form for the equation of a circle with center (h, k) and radius r is

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

EXAMPLE: Find the equation of a circle with center (–4, 6) and passing through the point (1, 2).

h K

FIND RADIUS!

r = DISTANCE BETWEEN (-4,6) & (1,2)

$= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(1-(-4))^2+(2-6)^2}$

$= \sqrt{25+16}$

$= \sqrt{41}$

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

$(x-(-4))^2+(y-6)^2=(\sqrt{41})^2$

$\boxed{(x+4)^2+(y-6)^2=41}$

To graph a circle on the TI-84, we first isolate y. This will result in **two** functions because of the $\pm$ sign.

$$(x+4)^2+(y-6)^2=41$$

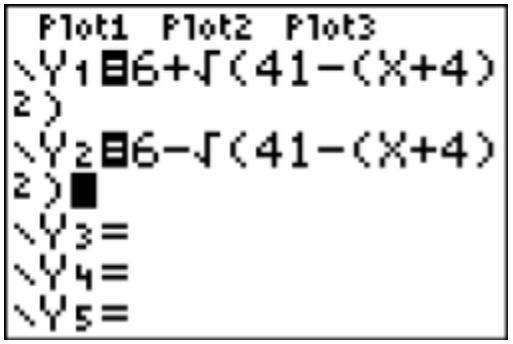
$$(y-6)^2=41-(x+4)^2$$

$$y-6=\pm\sqrt{41-(x+4)^2}$$

$$y=6\pm\sqrt{41-(x+4)^2}$$

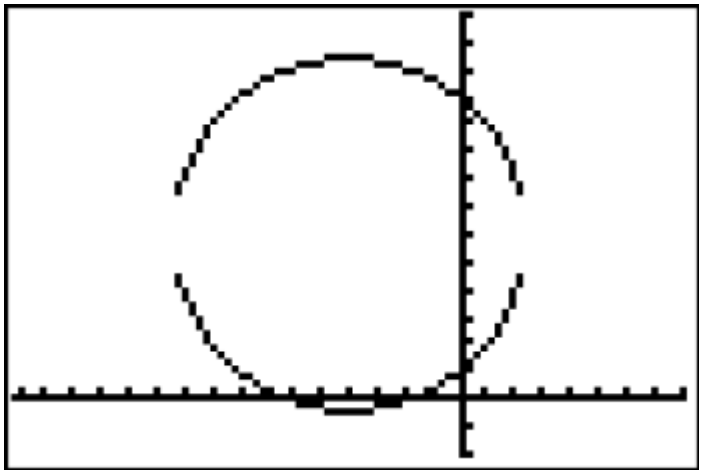
+ IS UPPER SEMICIRCLE

− IS LOWER "



You can use the ZOOM **ZSquare** command to remove the rectangular "distortion" and make the circle look truly round.

Key sequence: ZOOM 5:



EXAMPLE: Find the center and radius of the circle

$$(x-2)^2+(y+3)^2=\frac{16}{9}$$

and sketch the graph.

Center $(2,-3)$

$r=\sqrt{\frac{16}{9}}=\frac{4}{3}$