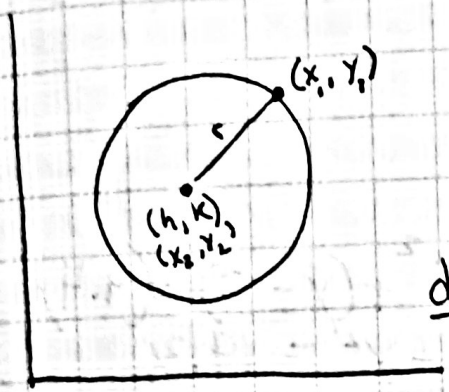
# Standard form of an equation of a circle

a circle is a set of point in a plane equidistant from a fixed point called the center
the radius is the distance from the center to any fixed point in the circle




treat $(h, k)$ like $(x_2, y_2)$
and $(x_1, y_1)$ to apply the
distance formula

standard form of an equation of a circle

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

simplified

$$r^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

| Equation | Standard Form | Center | Radius |
|---|---|---|---|
| $(x+3)^2+(y-1)^2=16$ | $(x-(-3))^2 + (y-1)^2 = 4^2$ | $-3, 1$ | $\sqrt{16} = 4$ |
| $(x-\frac{5}{4})^2 + y^2 = 5$ | $(x-\frac{5}{4})^2 + (y-0)^2 = (\sqrt{5})^2$ | $\frac{5}{4}, 0$ | $\sqrt{5}$ |
| $x^2+y^2=28$ | $(x-0)^2 + (y-0)^2 = (2\sqrt{7})^2$ | $0, 0$ | $2\sqrt{7}$ |

alternative form of an equation of a circle