

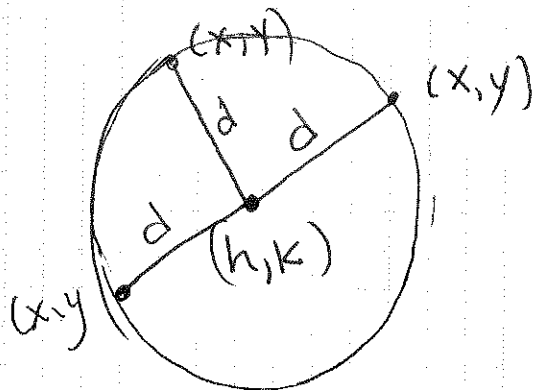
Warm-up

What is the distance between the points (h, k) and (x, y) ?

What shape do you think this is?

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad \begin{matrix} (h, k) \\ x_1, y_1 \end{matrix} \quad \begin{matrix} (x, y) \\ x_2, y_2 \end{matrix}$$

$$d = \sqrt{(x - h)^2 + (y - k)^2}$$



$$r = \sqrt{(x - h)^2 + (y - k)^2}$$

$$r^2 = (x - h)^2 + (y - k)^2 \leftarrow \begin{array}{l} \text{circle} \\ \text{radius } r \\ \text{center } (h, k) \end{array}$$

Circles

Definition: The set of all points that are equidistant from a given point.

Back to the warm up:

call the center point (h, k)

all other points are (x, y)

distance = radius

Circle Formula:

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

center (h, k)
opposite signs!!

distance formula
"un-square rooted"

Ex. Equation for a circle with
 $r = 10$ and center $(3, -2)$

Ex. What is the center and radius of

$$(x-3)^2 + (y-2)^2 = 25$$

h k r^2

center $(3, 2)$

radius 5

$$x^2 + (y-1)^2 = 81$$

$h=0$ $k=+1$ r^2

center $(0, 1)$

radius 9

Ex. Find the equation of the circle
with center $(0,0)$ and through $(4,3)$

$$\text{Eq- } (x-h)^2 + (y-k)^2 = r^2$$

Knowns - $h=0$ $k=0$

radius - distance from $(0,0)$ to $(4,3)$

$$d = \sqrt{4^2 + 3^2} \quad d = \sqrt{16+9} = d = \sqrt{25} \quad d=5$$

$$r=5 \quad r^2=25$$

$$\text{EQ: } (x-0)^2 + (y-0)^2 = 25$$
$$x^2 + y^2 = 25$$

Ex. Find the equation

① center $(2,-2)$ radius = 7

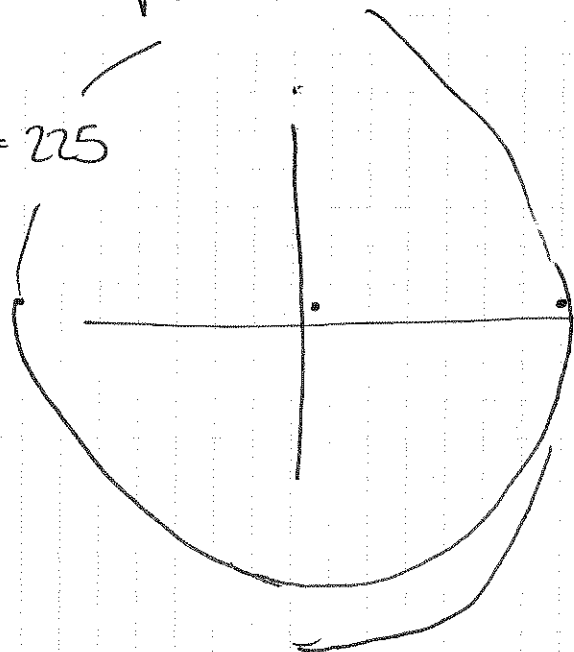
$$(x-2)^2 + (y-(-2))^2 = 7^2 \quad (x-2)^2 + (y+2)^2 = 49$$

② Center $(1,1)$ through $(10,13)$

$$r = \sqrt{(10-1)^2 + (13-1)^2} = \sqrt{81 + 144} = \sqrt{225}$$

$$r=15 \quad r^2=225$$

$$(x-1)^2 + (y-1)^2 = 225$$



graph $x^2 + y^2 = 25$ center $(0,0)$

