

17.1 Equation of a Circle

Thm. The equation of a circle is

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

where the center is (h, k) and the length of the radius is r .

Ex. Write the equation of the circle with center $(-4, 0)$
and radius $\sqrt{13}$

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

↓ ↓
h k

$$(x - -4)^2 + (y - 0)^2 = (\sqrt{13})^2$$

$$(x + 4)^2 + y^2 = 13$$

Pract. Write the equation of the circle with center (4, 3) and radius 6.

r →

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

↑
h ↑
k

$$(x-4)^2 + (y-3)^2 = 6^2$$

Pract. Write the equation of the circle with center (-1, 5) and radius $\sqrt{7}$.

r → $\sqrt{7}$

$$(x-(-1))^2 + (y-5)^2 = (\sqrt{7})^2$$

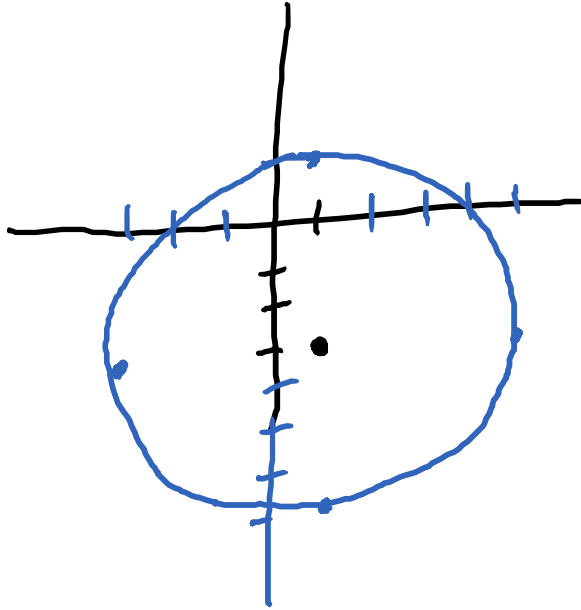
↑
h ↑
k

Ex. Sketch the graph of the circle $(x - 1)^2 + (y + 3)^2 = 16$

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

Center: $(1, -3)$
radius: 4

$$\sqrt{r^2} = \sqrt{16}$$
$$r = 4$$



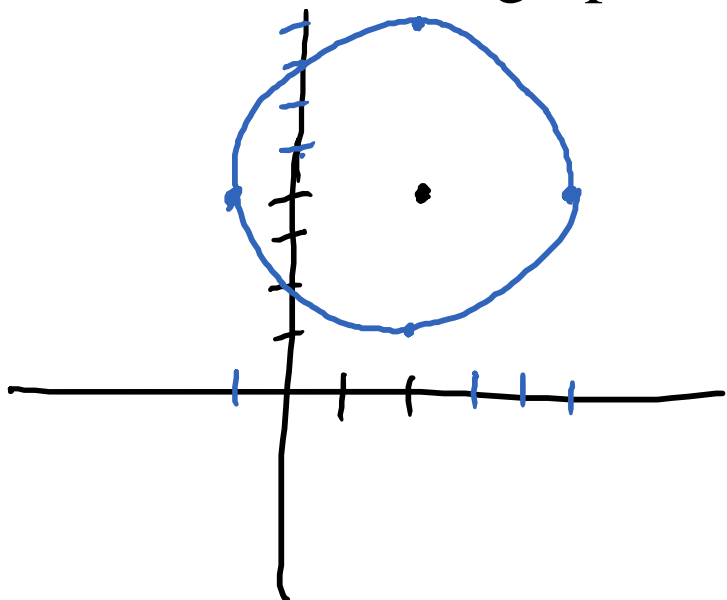
Pract. Sketch the graph of the circle $(x - 2)^2 + (y - 4)^2 = 9$

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

$$\sqrt{r^2} = \sqrt{9}$$
$$r = 3$$

center: $(2, 4)$

radius: 3



Ex. Write the equation of the circle with center $(2, 5)$ that passes through the point $(6, 5)$.

Ex. Consider the circle centered at $(0, 0)$ with a radius of 4.
Is the point $(3, \sqrt{7})$ on the circle?

Ex. Consider the circle centered at $(1, 4)$ with a radius of 5.

Is the point $(4, -2)$ on the circle? h k r

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

$$(x-1)^2 + (y-4)^2 = 5^2$$

$$(4-1)^2 + (-2-4)^2 = 5^2$$

$$3^2 + (-6)^2 = 5^2$$

$$9 + 36 = 25$$

$$45 = 25$$

X

no

You are going to design a picture using at least 5 circles, adding other lines or shapes as you please.

- 1) Take graph paper and draw the x - and y -axes.
 - 2) Draw your picture, using a compass to draw at least 5 circles.
 - 3) On the back of the paper, write the equations of all of your circles.
 - 4) Color your picture.
- Be creative. Your drawing does not have to look like anything in particular; it can be a random design.

This assignment is worth 30 points and is due at the end of the period. *on Friday.*