TODAY'S AGENDA: May 21- June 5

- Work on Khan Academy Mission:
- Whole Class Lessons
- Today's Objective:
- Equations of Circles

- Standards:
- G.GPE. A.1:
- 1a. Derive the equation of a circle of given center and radius using the Pythagorean Theorem.
- Find the center and radius of a circle, given the equation of the circle.
- 1b. Graph circles given their equation.

Features of a Circle From its Standard Equation

- Standard Form of a Circle

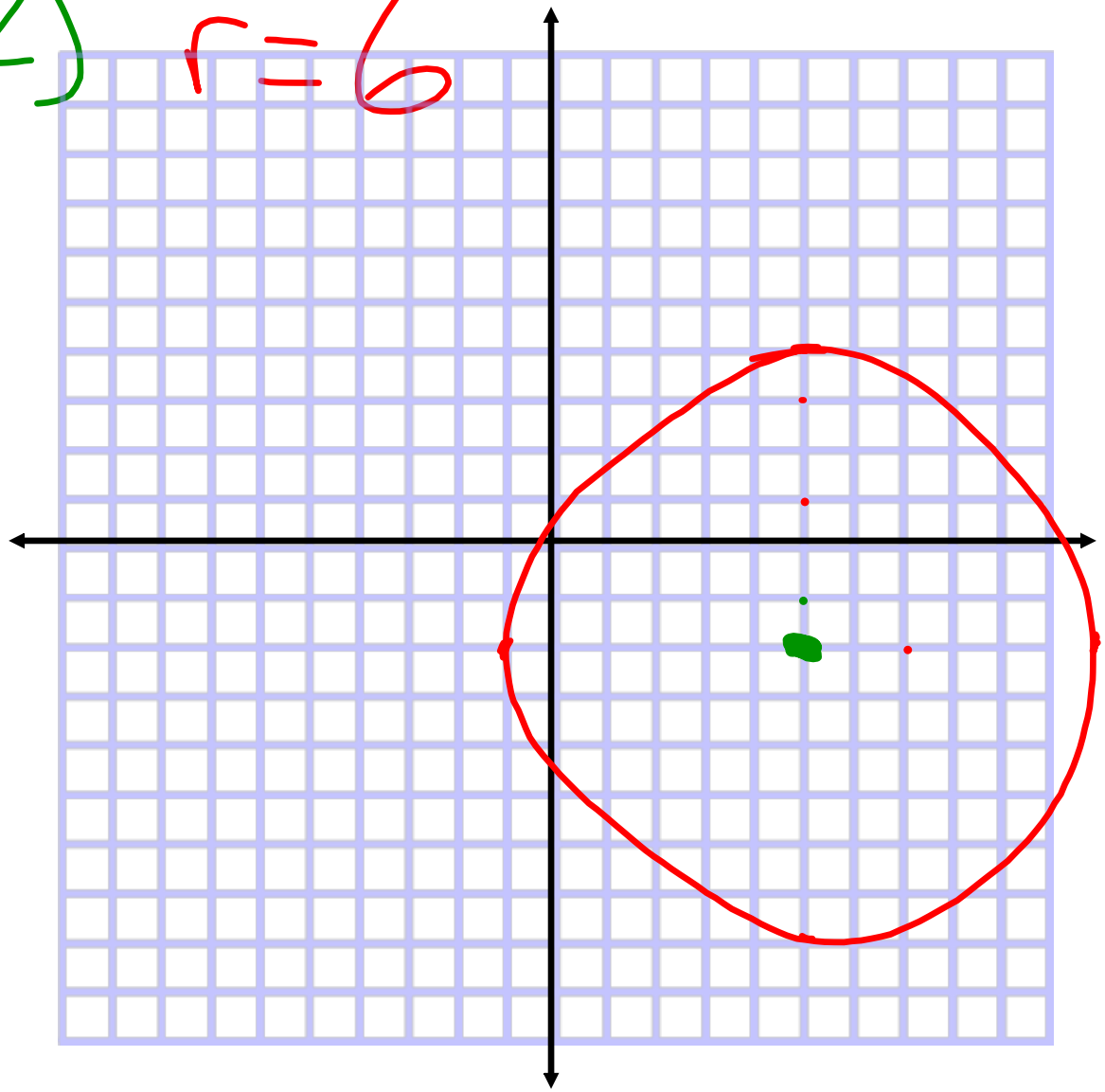
$$(x - h)^2 + (y - k)^2 = r^2$$

Where (h, k) is the coordinate for the center of the circle, and r is the radius of the circle.

Example: $(x - 5)^2 + (y + 2)^2 = 36$

$(5, -2)$ $r = 6$

(5, −2) r = 6



The equation of a circle is given below.

$$(x - 13.4)^2 + (y + 2.6)^2 = 100$$

What is its center?

(13.4 , -2.6)

What is its radius?

If necessary, round your answer to two decimal places.

10 units

$10 \cdot 10 = 100$

The equation of a circle is given below.

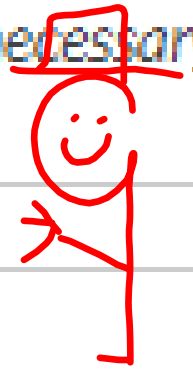
$$(x - 20)^2 + (y - 0.05)^2 = 81$$

What is its center?

(20 , 0.05)

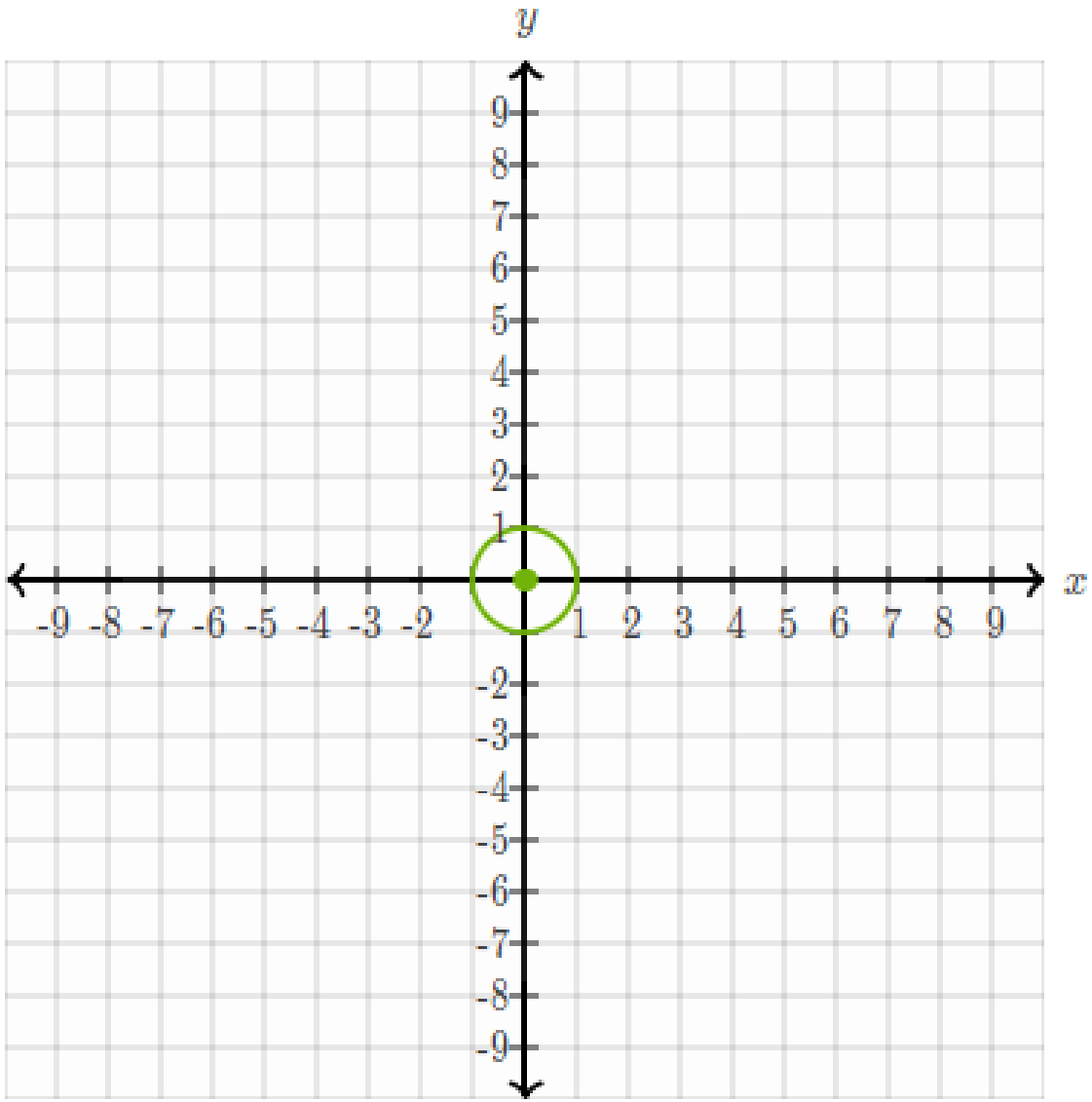
What is its radius?

If necessary, round your answer to two decimal places.

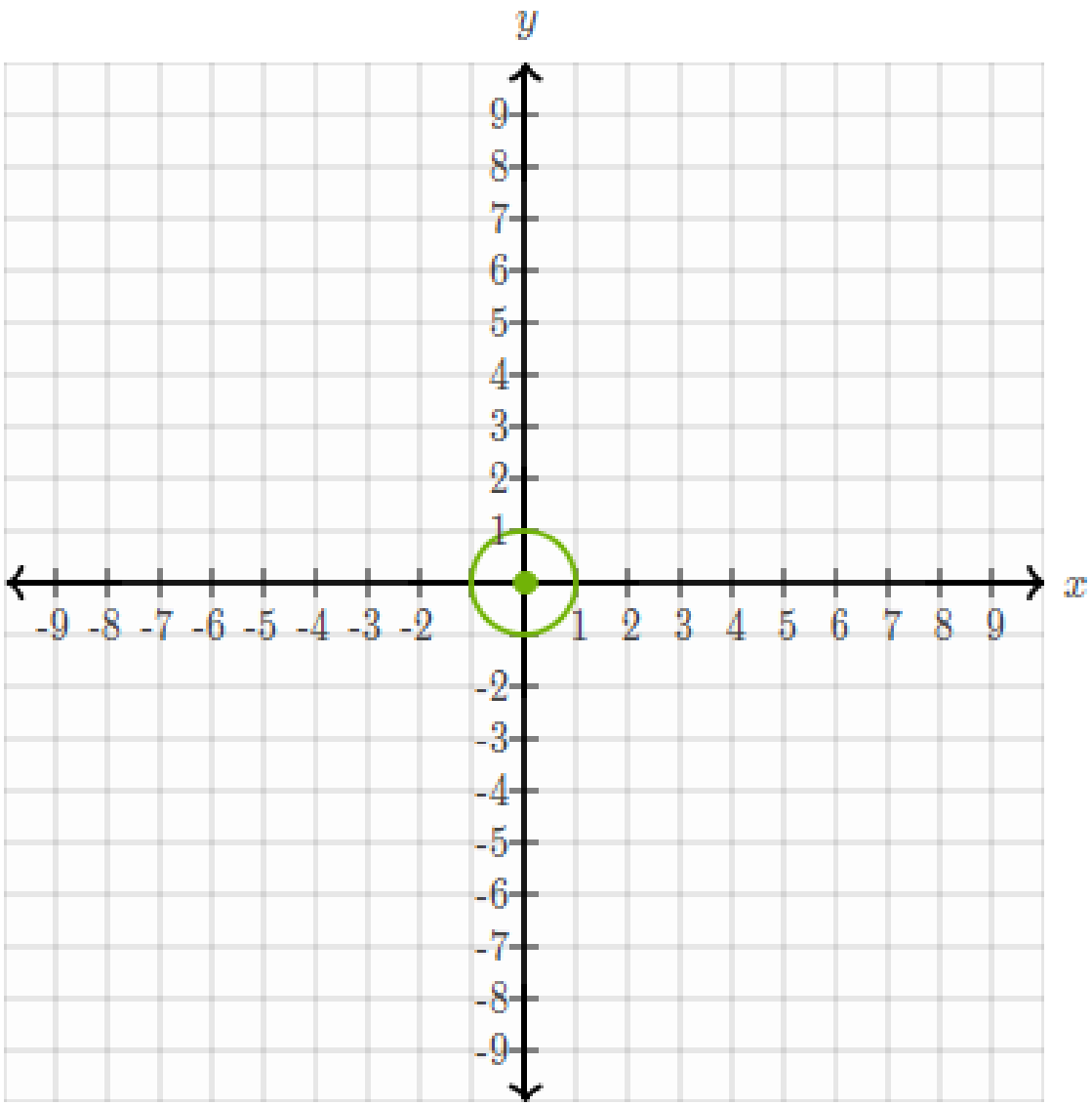


units

Graph the circle $(x+7)^2+(y-5)^2=4$.



Graph the circle $(x-1)^2+(y-8)^2=4$.



Writing Equations of a Circle in Standard Form

A circle has a radius of $\sqrt{13}$ units and is centered at $(-9.3, 4.1)$.

Write the equation of this circle.

Box

$$(x+9.3)^2 + (y-4.1)^2 = 13$$

$r = \sqrt{13}$

$r^2 = 13$

A circle has a radius of $\frac{5}{3}$ units and is centered at $(9.2, -7.4)$.

Write the equation of this circle.

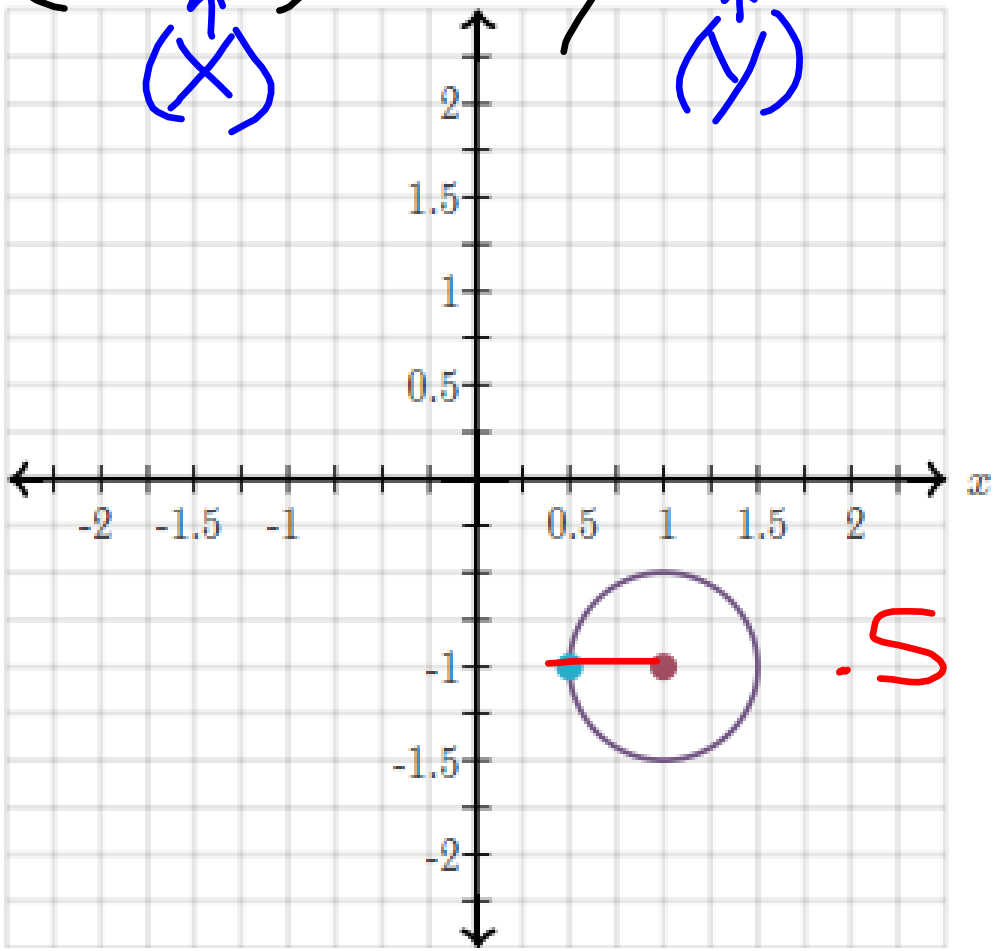
$$(x-9.2)^2+(y+7.4)^2=\frac{25}{9}$$

Write the equation of the circle graphed below.

$(x-1)^2+(y+1)^2=.25$

(x) (y) (r^2)

$.5^2$



$C(1,-1)$

$.5$

$.5 \times .5$

A circle has a radius of $\frac{5}{3}$ units and is centered at $(9.2, -7.4)$.

Write the equation of this circle.

Circles in Expanded form
and
Completing the Square

HALF and SQUARE

Equations of a Circle in Expanded Form
&
Completing the Square

What is the missing constant term in the perfect square that starts with $x^2 + 10x$?

$x^2 + 10x + 25$

What is the missing constant term in the perfect square that starts with $x^2 - 16x$?

$x^2 - 16x + 64$

8^2 8^2

A certain circle can be represented by the following equation.

$$x^2 + y^2 + 10x + 12y + 25 = 0$$

What is the center of this circle?

(-5 , -6)

What is the radius of this circle?

6 units

$$x^2+y^2+10x+12y+25=0$$

$x^2+10x+25 \quad y^2+12y+36$

$(x+5)^2+(y+6)^2$

-25
$+25$
$+36$
36

$(-5,-6) \quad r=6$

A certain circle can be represented by the following equation.

$$x^2 + y^2 + 12x + 4y + 15 = 0$$

What is the center of this circle?

(−6 , −2)

What is the radius of this circle?

5 units

$x^2 + 12x + 36$ $y^2 + 4y + 4$

$(x+6)^2$ $(y+2)^2$

$(-6, -2)$

$r = 5$

-15
$+36$
$+4$

$\sqrt{25}$

A certain circle can be represented by the following equation.

$$x^2 + y^2 + 6y - 72 = 0$$

What is the center of this circle?

(0 , −3)

What is the radius of this circle?

9 units

$y^2 + 6y + 9$

$(y+3)^2$

$72 + 9$

$\sqrt{81}$

$$x^2 + y^2 - 2x - 10y + 17 = 0$$

$x^2 - 2x + 1$ $y^2 - 10y + 25$

$(x-1)^2$ $(y-5)^2$

center $(1, 5)$ radius: 3

Radius

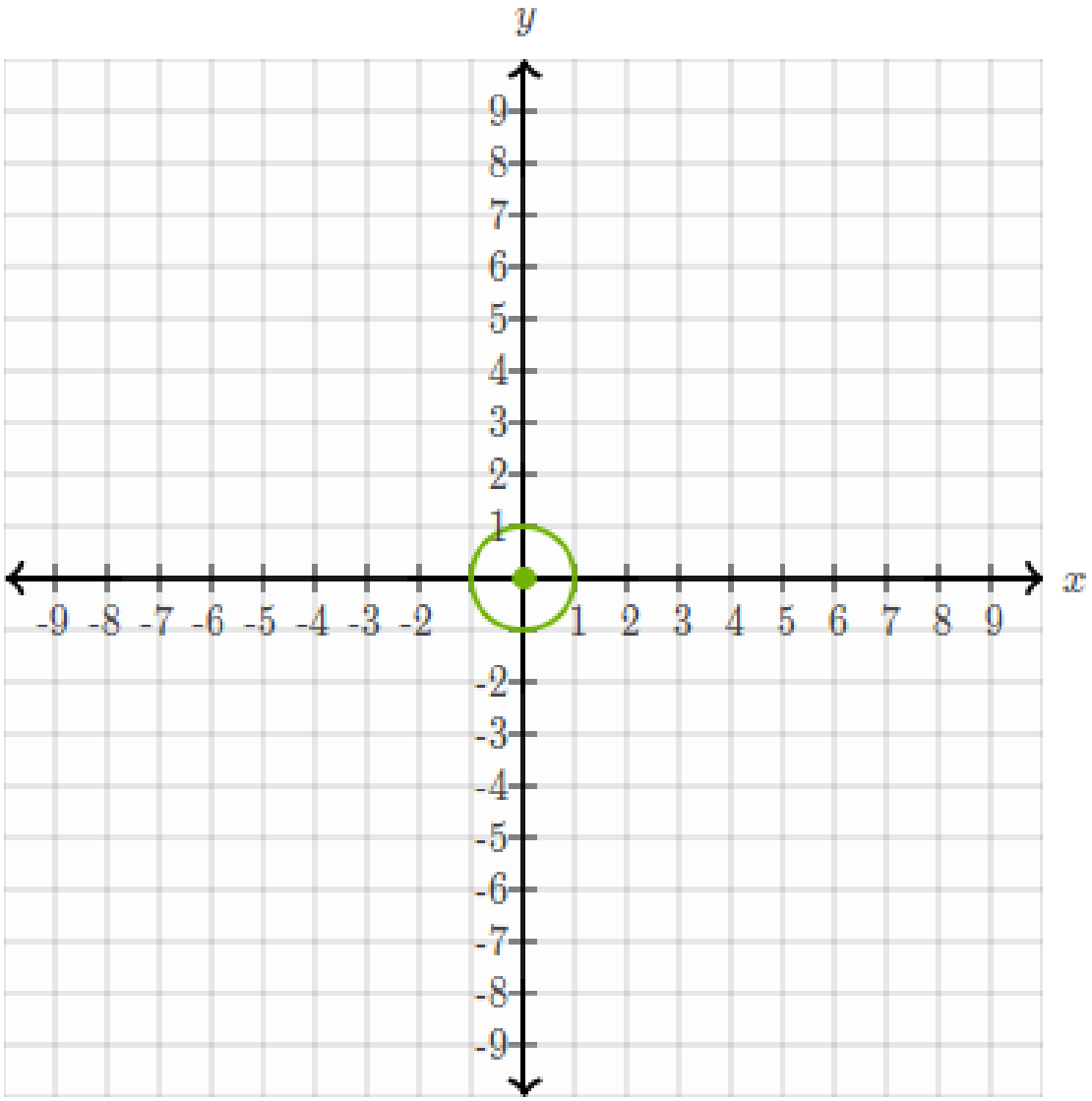
-17

$+1$

$+25$

$\sqrt{9}$

Graph the circle $x^2 + y^2 + 2x + 4y - 44 = 0$.



Skills You Should Be Working on:

1. Features of a circle from its standard equation
2. Graph a circle from its standard equation
3. Write standard equation of a circle
4. Features of a circle from its expanded equation
5. Graph a circle from its expanded equation