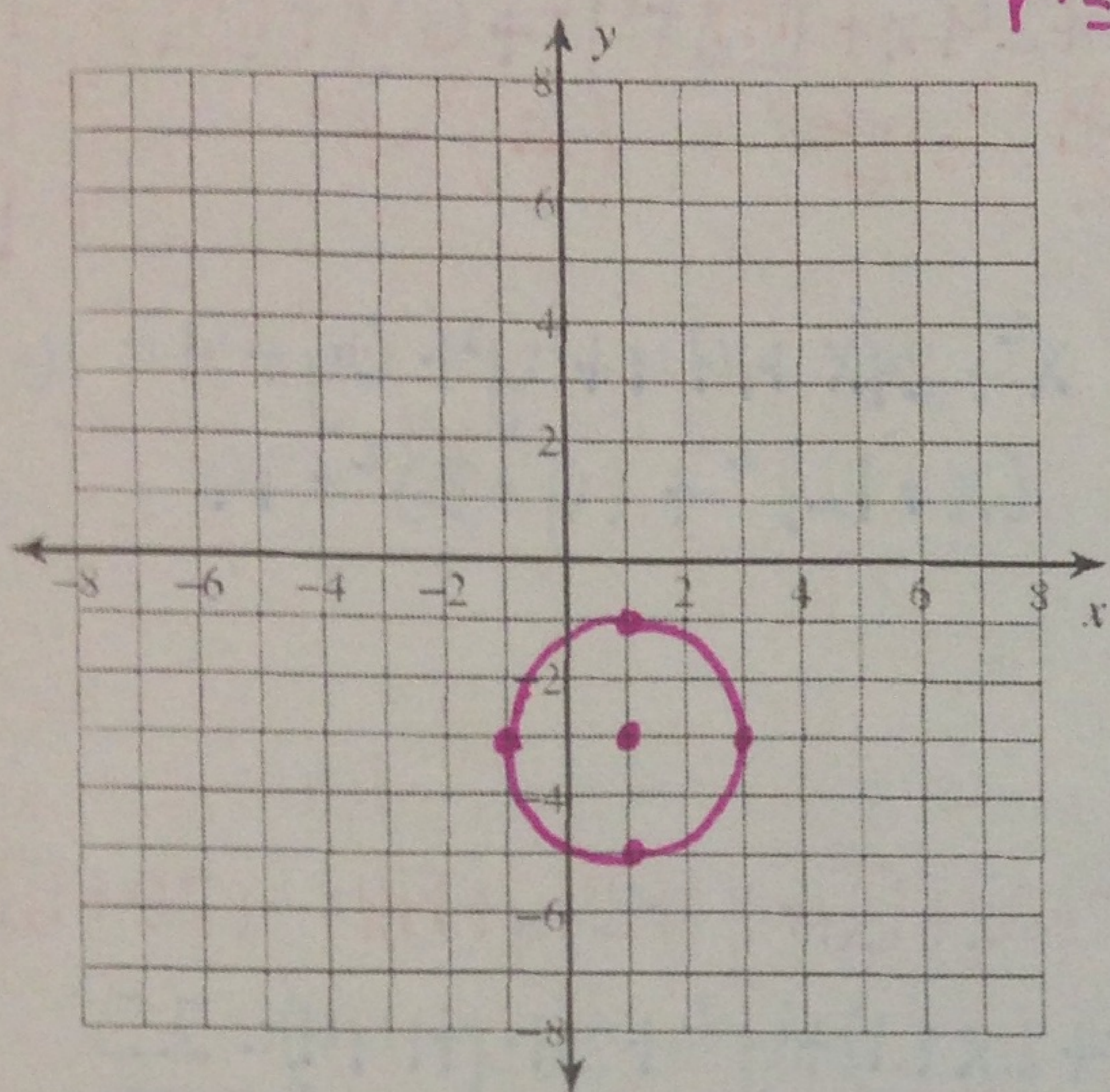
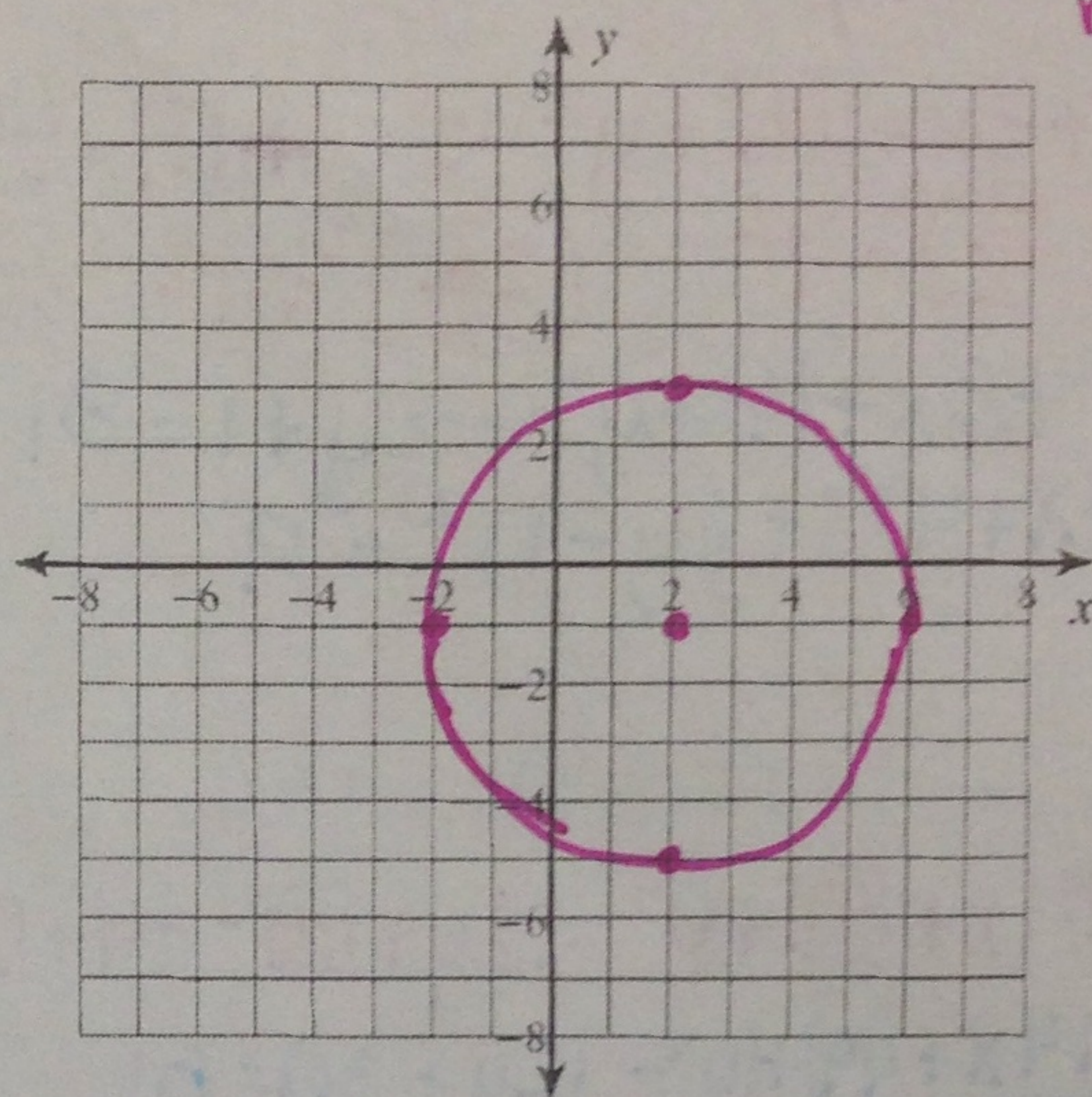


Identify the center and radius of each. Then sketch the graph.

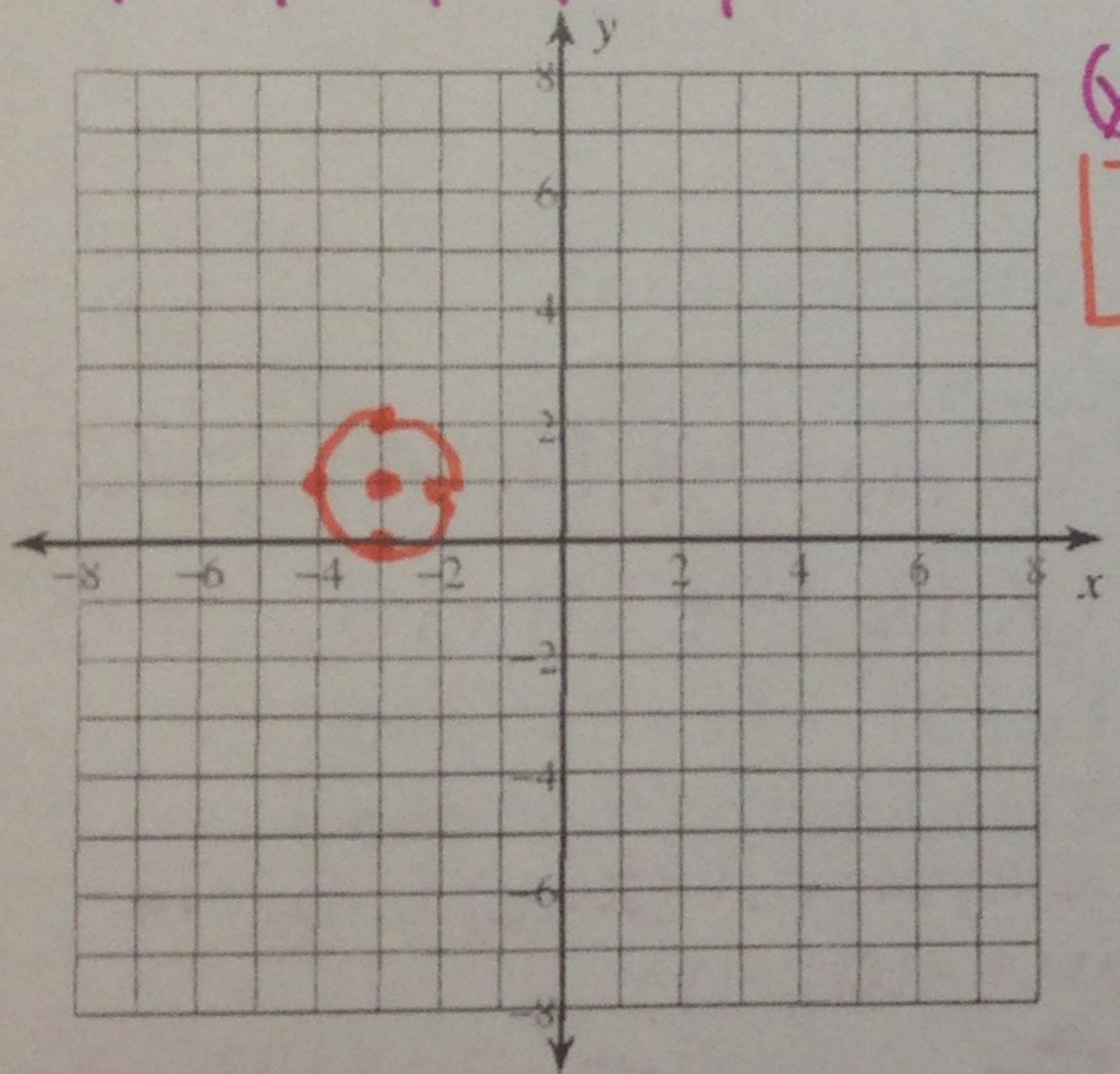
1) $(x-1)^2 + (y+3)^2 = 4$ center $(1, -3)$
 $r=2$



2) $(x-2)^2 + (y+1)^2 = 16$ center $(2, -1)$
 $r=4$

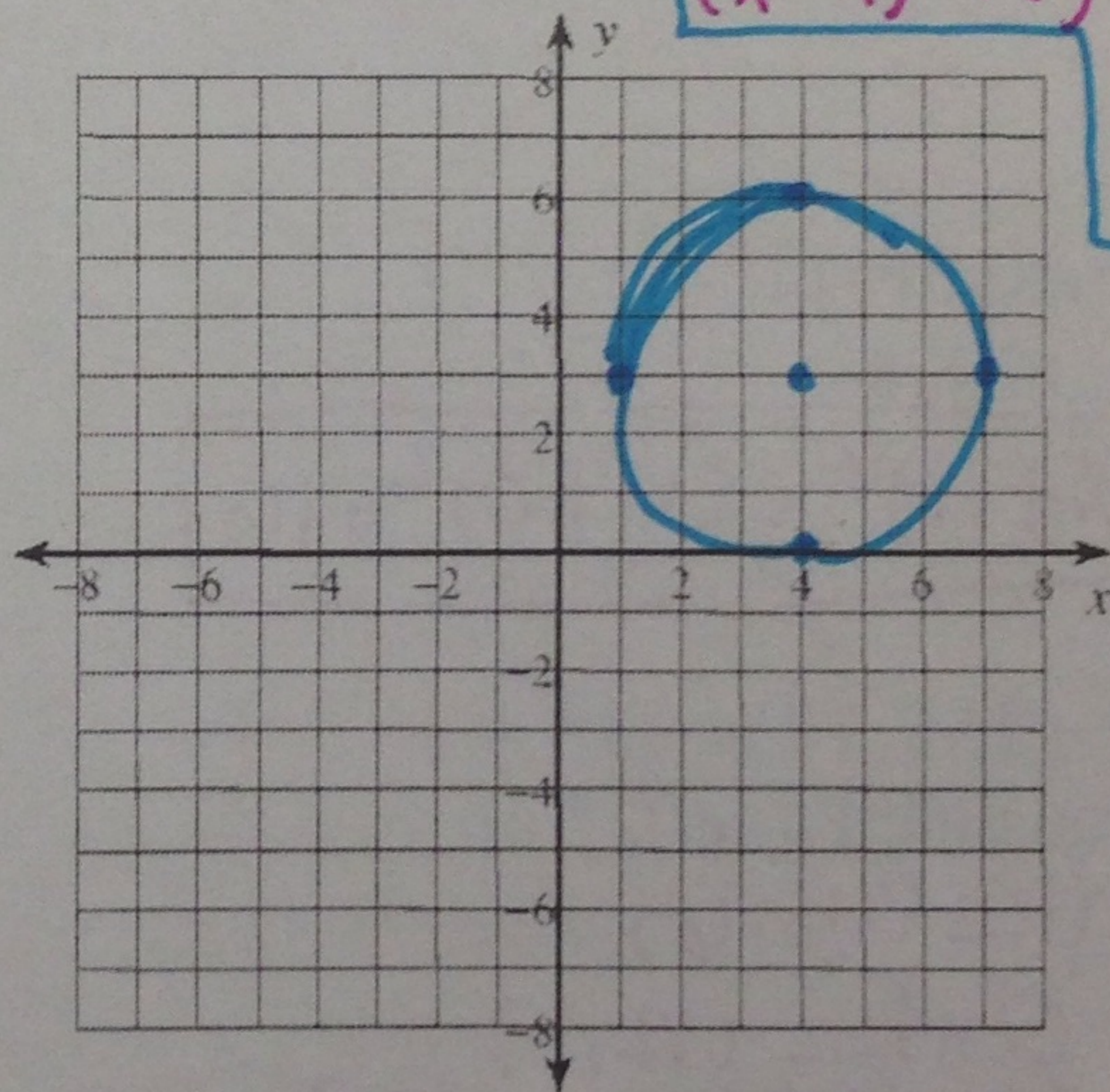


7) $-9 = -2y + y^2 - 16x + x^2$



$(x+3)^2 + (y-1)^2 = 1$
 $C = (-3, 1)$
 $r = 1$

8) $16 + x^2 + y^2 - 8x - 6y = 0$



$(x-4)^2 + (y-3)^2 = 9$
 $C(4, 3)$
 $r = 3$

Use the information provided to write the equation of each circle.

9) Center: $(13, -13)$

Radius: 4

$(x-13)^2 + (y+13)^2 = 16$

10) Center: $(-13, -16)$

Point on Circle: $(-10, -16)$

$(-10+13)^2 + (-16+16)^2 = r^2$

$3^2 + 0 = r^2$

$9 = r^2$

$(x+13)^2 + (y+16)^2 = 9$

~~X~~ Ends of a diameter: $(18, -13)$ and $(4, -3)$

Use the information provided to write the standard form equation of each circle.

1) $8x + x^2 - 2y = 64 - y^2$

$$x^2 + 8x + 16 + y^2 - 2y + 1 = 64 + 16 + 1$$

$(\frac{8}{2})^2 = 4^2$ $(\frac{-2}{2})^2 = (-1)^2$

$$x^2 + 8x + 16 + y^2 - 2y + 1 = 81$$

$$(x+4)^2 + (y-1)^2 = 9$$

2) $-137 + 6y = -y^2 + x^2 + 24x + 6y$

$$x^2 + 24x + 144 + y^2 + 6y + 9 = -137 + 144 + 9$$

$(\frac{24}{2})^2 = 12^2$

$(\frac{6}{2})^2 = 3^2$

$$x^2 + 24x + 144 + y^2 + 6y + 9 = 16$$

$$(x+12)^2 + (y+3)^2 = 16$$

3) $x^2 + y^2 + 14x - 12y + 4 = 0$

$$x^2 + 14x + 49 + y^2 - 12y + 36 = -4 + 49 + 36$$

$$(x^2 + 14x + 49) + (y^2 - 12y + 36) = 81$$

$$(x+7)^2 + (y-6)^2 = 81$$

4) $y^2 + 2x + x^2 = 24y - 120$

$$x^2 + 2x + 1 + y^2 + 24y + 144 = -120 + 1 + 144$$

$$(x^2 + 2x + 1) + (y^2 + 24y + 144) = 25$$

$$(x+1)^2 + (y+12)^2 = 25$$

7) Center: $(-11, -8)$

Radius: 4

$$(x+11)^2 + (y+8)^2 = 16$$

9) $(x-16)^2 + (y-6)^2 = 1$

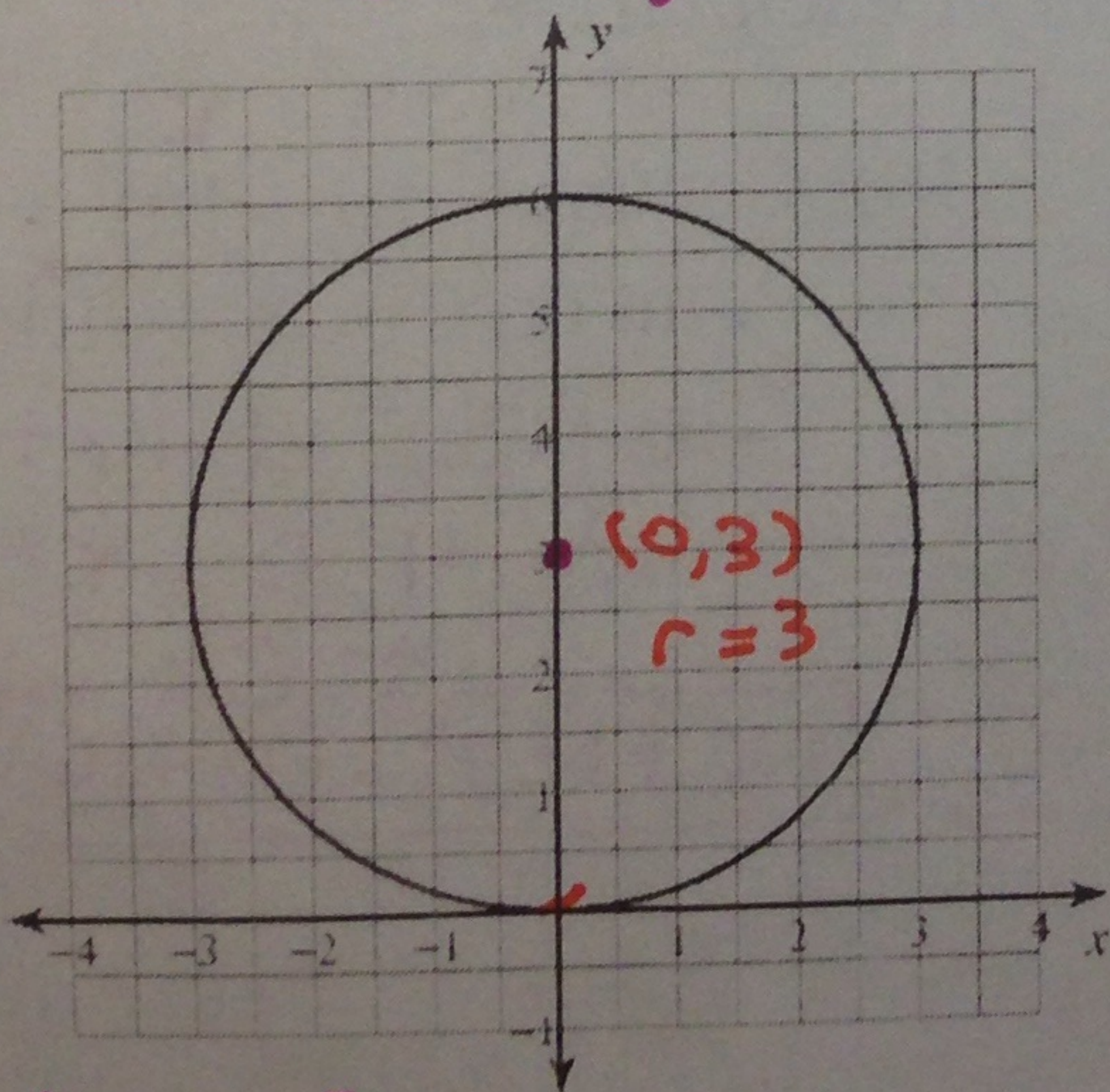
Translated 4 left, 2 up

og: center $(16, 6)$

New: center $(12, 8)$

$$(x-12)^2 + (y-8)^2 = 1$$

11)



$$(x-0)^2 + (y-3)^2 = 9$$

$$x^2 + (y-3)^2 = 9$$

8) Center: $(-6, -15)$

Radius: $\sqrt{5}$

$$(x+6)^2 + (y+15)^2 = (\sqrt{5})^2$$

$$(x+6)^2 + (y+15)^2 = 5$$

10) $(x+5)^2 + (y+7)^2 = 36$

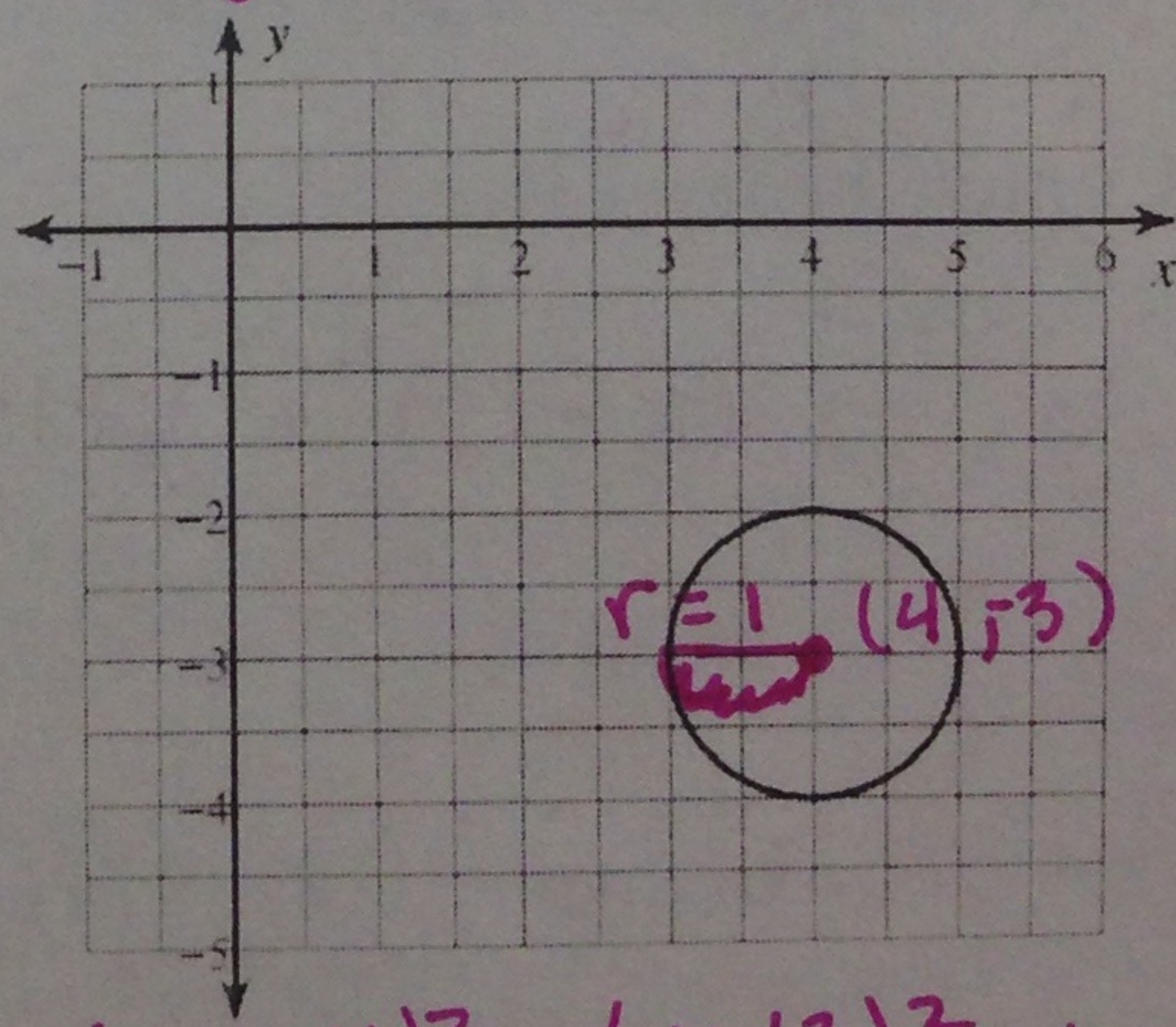
Translated 5 left, 4 down

og: center: ~~(-5, -7)~~ $(-5, -7)$

New: $(-10, -11)$

$$(x+10)^2 + (y+11)^2 = 36$$

12)



$$(x-4)^2 + (y+3)^2 = 1$$