

## Standard Form of Circles

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

center:

$$(h, k)$$

radius:

$$r$$

Point on the circle:

$$(x, y)$$

1) Determine the center and radius of a circle given the equation

a)  $x^2 + y^2 = \frac{9}{4}$

center:  $(0, 0)$

radius:  $\sqrt{\frac{9}{4}} = \frac{3}{2}$

b)  $(x+3)^2 + (y-5)^2 = 81$

center:  $(-3, 5)$

radius:  $\sqrt{81} = 9$

c)  $(x+4)^2 + (y+6)^2 = 1$

center:  $(-4, -6)$

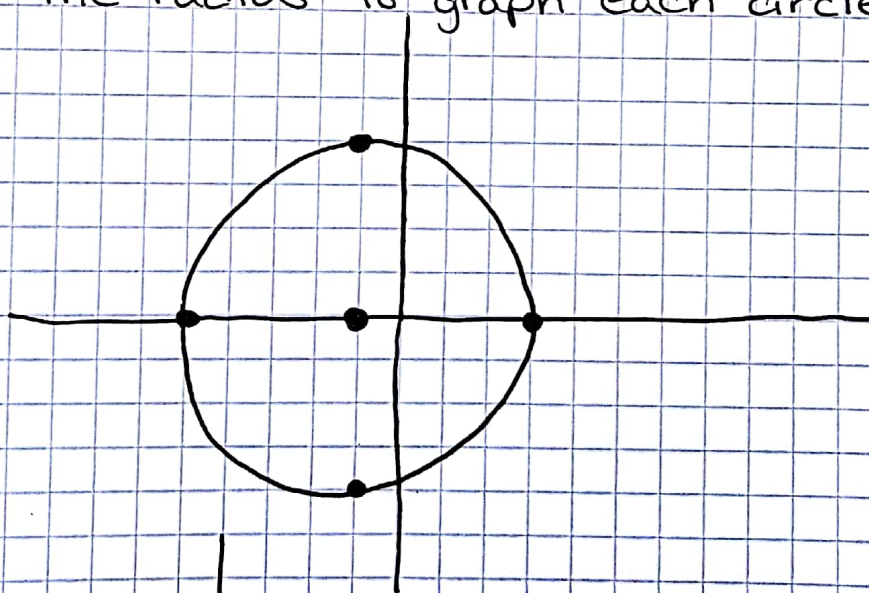
radius:  $\sqrt{1} = 1$

2) Use the center and the radius to graph each circle.

a)  $(x+2)^2 + y^2 = 64$

center:  $(-2, 0)$

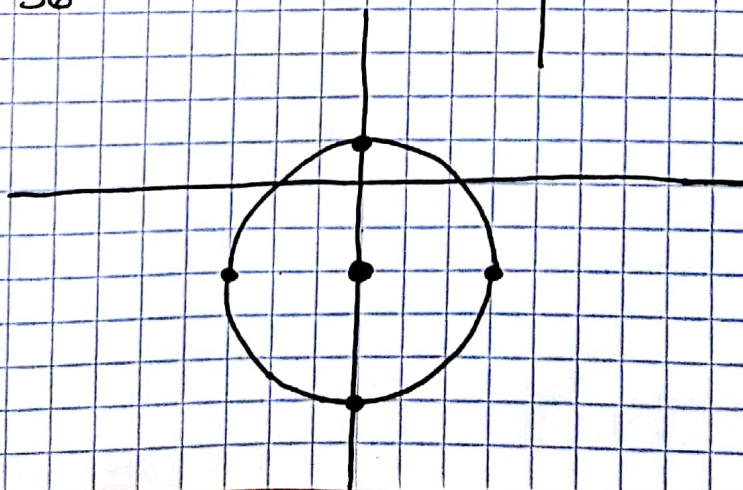
radius:  $\sqrt{64} = 8$



b)  $x^2 + (y+4)^2 = 36$

center:  $(0, -4)$

radius: 6





$$4x^2 + 4y^2 - 16x - 24y + 51 = 0$$

$$4x^2 + 4y^2 - 16x - 24y = -51$$

$$\frac{4x^2}{4} - \frac{16x}{4} + \frac{4y^2}{4} - \frac{24y}{4} = \frac{-51}{4}$$

$$x^2 - 4x + y^2 - 6y = \frac{-51}{4}$$

$$(x^2 - 4x) + (y^2 - 6y) = \frac{-51}{4}$$

multiply by  $\frac{1}{2}$

$$\boxed{-2} \xrightarrow{\text{square it}} 4$$

multiply by  $\frac{1}{2}$

$$\boxed{-3} \xrightarrow{\text{square it}} 9$$

$$(x^2 - 4x + 4) + (y^2 - 6y + 9) = \frac{-51}{4} + 4 + 9$$

$$(x - 2)^2 + (y - 3)^2 = \frac{1}{4}$$

center:  $(2, 3)$

radius:  $\sqrt{\frac{1}{4}} = \frac{1}{2}$

$$x^2 + y^2 - 8x + 7 = 0$$

$$x^2 + y^2 - 8x = -7$$

$$x^2 - 8x + y^2 = -7$$

$$(x^2 - 8x) + (y^2 + 0y) = -7$$

↓

$$\boxed{-4} \rightarrow 16$$

↓

$$0 \rightarrow 0$$

$$(x^2 - 8x + 16) + (y^2 + 0y + 0) = -7 + 16 + 0$$

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

center:  $(4, 0)$

radius: 3