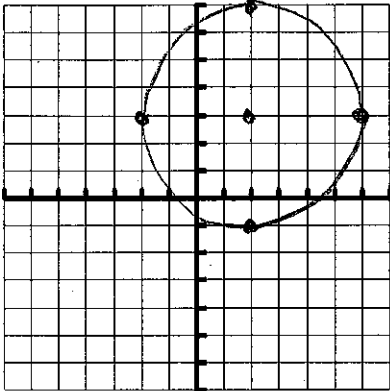


For each circle state the center & radius, and then graph.

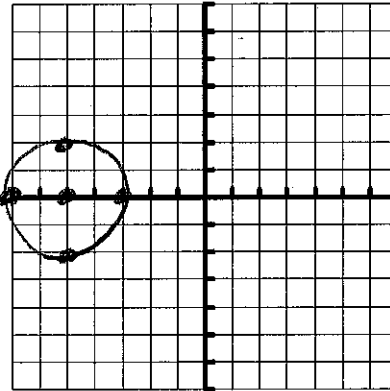
1.  $(x-2)^2 + (y-3)^2 = 16$

center:  $(2, 3)$   $r = 4$



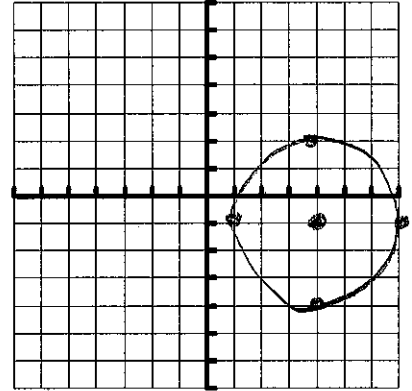
2.  $(x+5)^2 + y^2 = 4$

center:  $(-5, 0)$   $r = 2$



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

center:  $(4, -1)$   $r = 3$



Write each equation in standard form. Identify the center and the radius. Then sketch the graph.

4.  $x^2 + y^2 + 24x + 6y + 152 = 0$

$$x^2 + 24x + \frac{144}{1} + y^2 + 6y + \frac{9}{1} = -152 + 144 + 9$$

$$\left(\frac{24}{2}\right)^2 = 12^2 = 144 \quad \left(\frac{6}{2}\right)^2 = 3^2 = 9$$

$$(x+12)^2 + (y+3)^2 = 1 \quad c: (-12, -3) \quad r: 1$$

5.  $x^2 + y^2 - 4x + 6y - 3 = 0$

$$x^2 - 4x + \frac{4}{1} + y^2 + 6y + \frac{9}{1} = 3 + 4 + 9$$

$$\left(\frac{-4}{2}\right)^2 = (-2)^2 = 4 \quad \left(\frac{6}{2}\right)^2 = 3^2 = 9$$

$$(x-2)^2 + (y+3)^2 = 16 \quad c: (2, -3) \quad r: 4$$

6.  ~~$x^2 + y^2 + 6x + 24y + 89 = 0$~~   $2x^2 + 2y^2 + 12x + 48y + 178 = 0$

$$2x^2 + 12x + 2y^2 + 48y = -178$$

$$2(x^2 + 6x + \frac{9}{1}) + 2(y^2 + 24y + \frac{144}{1}) = -178 + 18 + 288$$

$$\left(\frac{6}{2}\right)^2 = 9 \quad \left(\frac{24}{2}\right)^2 = 144$$

$$\frac{2(x+3)^2 + 2(y+12)^2}{2} = 128$$

$$(x+3)^2 + (y+12)^2 = 64 \quad c: (-3, -12) \quad r: 8$$

Write the standard form equation of each circle.

7. Write the equation of the circle with center  $(h, k)$  and radius  $r$ .

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

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

$$\boxed{(x-4)^2 + (y+2)^2 = 9}$$

8. Write the equation of the circle with center  $(h, k)$  passing through  $(x, y)$ .

$$(x-h)^2 + (y-k)^2 = r^2 \rightarrow (x-0)^2 + (y-0)^2 = 29$$

$$(2-0)^2 + (5-0)^2 = r^2$$

$$\boxed{x^2 + y^2 = 29}$$

$$2^2 + 5^2 = r^2$$

$$4 + 25 = r^2$$

$$29 = r^2$$

9. Find the equation of the circle with center  $(-1, 2)$  and diameter 8.

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

$$r = 4$$

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

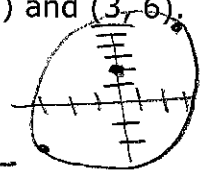
$$\boxed{(x+1)^2 + (y-2)^2 = 16}$$

10. Write the equation of the circle whose diameter has endpoints  $(-3, -2)$  and  $(3, 6)$ .

Center  $\rightarrow$  midpt:  $(\frac{-3+3}{2}, \frac{-2+6}{2}) = (\frac{0}{2}, \frac{4}{2}) = (0, 2)$

distance of radius:  $(0, 2)(3, 6)$

$$\sqrt{(3-0)^2 + (6-2)^2} = \sqrt{3^2 + 4^2} = \sqrt{9+16} = \sqrt{25} = 5$$



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

$$(x-0)^2 + (y-2)^2 = 5^2$$

$$\boxed{x^2 + (y-2)^2 = 25}$$

Answers:

1) C:  $(2, 3)$   $r = 4$

2) C:  $(-5, 0)$   $r = 2$

3) C:  $(4, -1)$   $r = 3$

4) C:  $(-12, -3)$   $r = 1$

5) C:  $(2, -3)$   $r = 4$

6) C:  $(-3, -12)$   $r = 8$

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

8)  $x^2 + y^2 = 29$

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

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