Standard Form of a Circle:

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

Center: (h, k)
Radius: r

*notice we take the opposite of h & k

1. Identify the center and radius of each equation:

a) $(x + 10)^2 + (y + 5)^2 = 25$

$C: (-10, -5)$
$r = \sqrt{25} = \boxed{5}$

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

$C: (-9, -1)$
$r = \sqrt{16} = \boxed{4}$

c) $(x - 14)^2 + (y + 8)^2 = 15$

$C: (14, -8)$
$r = \sqrt{15}$ $\overset{\wedge}{\underset{3 \quad 5}{\sqrt{15}}}$

d) $(x + 12)^2 + (y - 6)^2 = 13$

$C: (-12, 6)$
$r = \sqrt{13}$

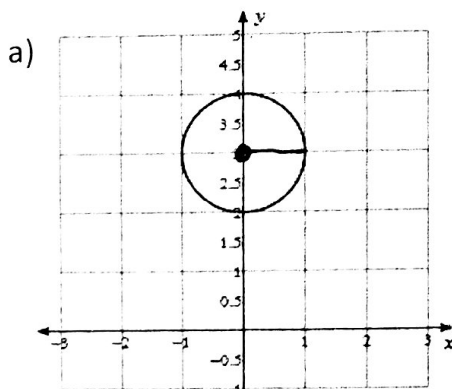e) $(x - 2)^2 + (y - 3)^2 = 1$

$C: (2, 3)$
$r = \sqrt{1} = \boxed{1}$

f) $(x - 4)^2 + (y + 13)^2 = 5$

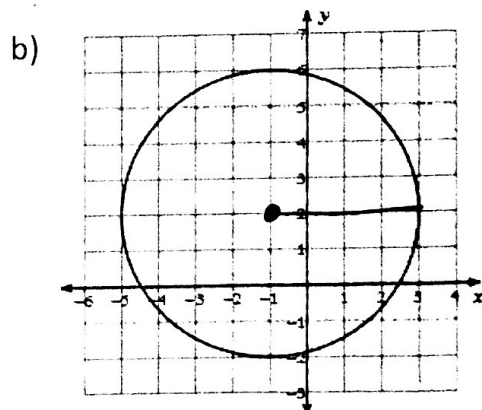$C: (4, -13)$
$r = \sqrt{5}$

2. Find the center and radius for each circle pictured. Then write the equation of the circle in standard form.

a)

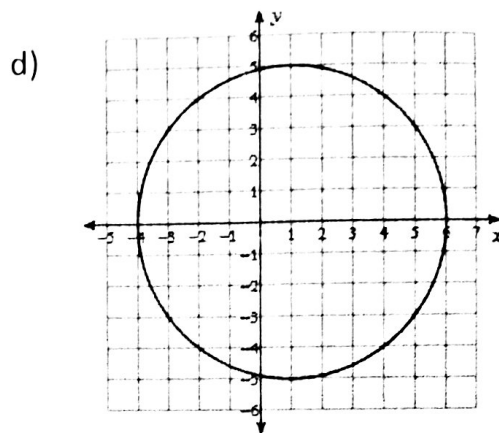$C: (0, 3)$ $r = 1$
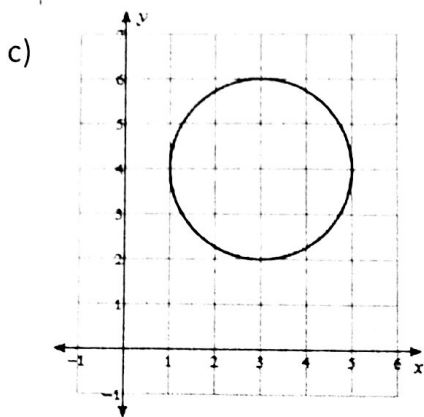
$(x-0)^2 + (y-3)^2 = 1^2$

$\boxed{x^2 + (y-3)^2 = 1}$
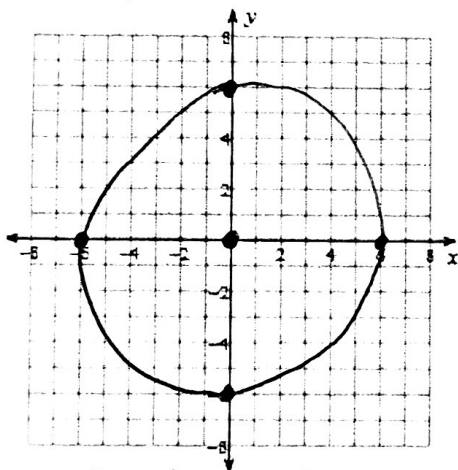
b)

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

$(x+1)^2 + (y-2)^2 = 4^2$
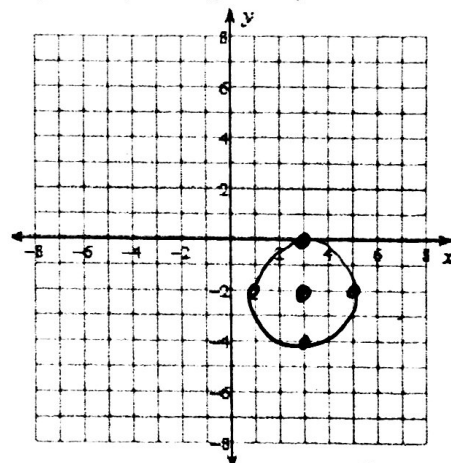
$\boxed{(x+1)^2 + (y-2)^2 = 16}$

c)

d)

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

a) $x^2 + y^2 = 36$
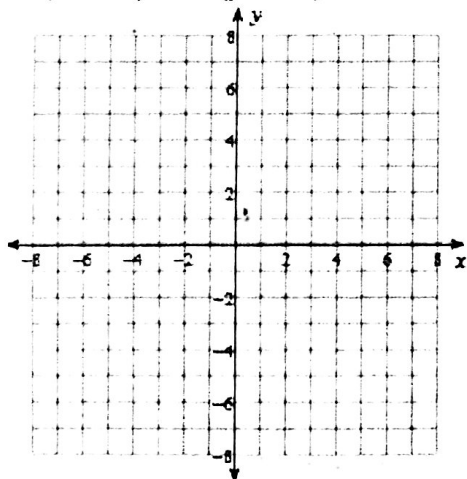

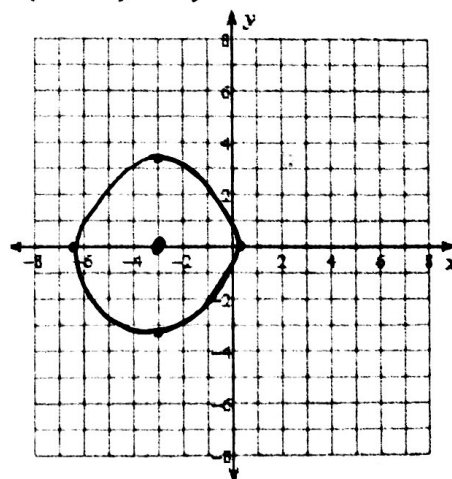$C: (0,0)$ $r = \sqrt{36} = 6$

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

$C: (3, -2)$ $r = \sqrt{4} = 2$

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

d) $(x + 3)^2 + y^2 = 10$

$C: (-3, 0)$
$r = \sqrt{10} \approx 3.2$

This process is very similar to finding the a-value of a quadratic from 6.2.

3. Writing the equation of a circle give the center and a point on the circle:

a) Center: $(-2, -3)$; Point on the circle: $(15,2)$

$$(x+2)^2 + (y+3)^2 = r^2$$
$$(15+2)^2 + (2+3)^2 = r^2$$
$$17^2 + 5^2 = r^2$$
$$289 + 25 = r^2$$
$$r^2 =$$

$$\boxed{(x+2)^2 + (y+3)^2 = 314}$$

b) Center: $(1,0)$; Point on the circle: $(10,15)$

$$(x-1)^2 + (y-0)^2 = r^2$$
$$(10-9)^2 + (15-0)^2 = r^2$$
$$1^2 + 15^2 = r^2$$
$$1 + 225 = r^2$$
$$r^2 = 226$$

$$\boxed{(x-1)^2 + y^2 = 226}$$

c) Center: $(-12,11)$; Point on the circle: $(-17,12)$

d) Center: $(14, -10)$; Point on the circle: $(12, -13)$