**Classwork 2,** MATH 1113 Harrison Chapman Name & Time: Key

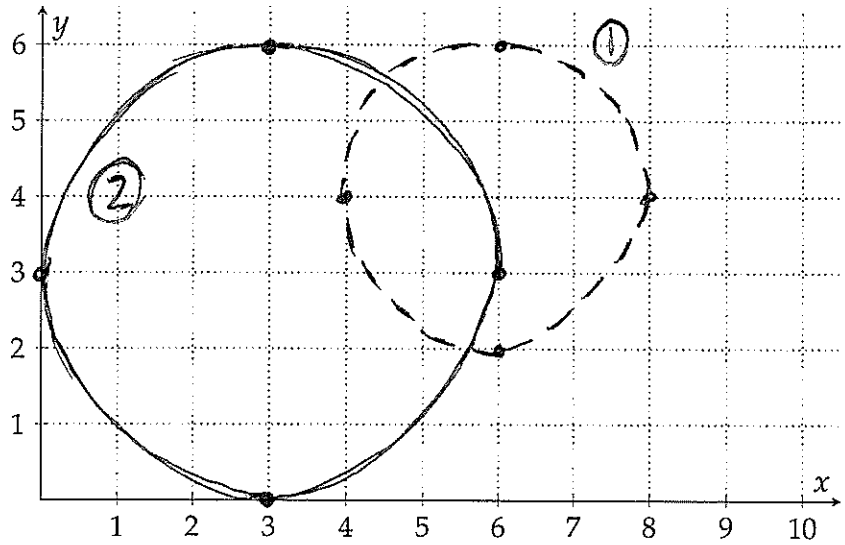
**1.** The equations,

$$(1)\ (x-6)^2-(y-4)^2=4 \quad \text{and} \quad (x-3)^2-(y-3)^2=9\ (2)$$

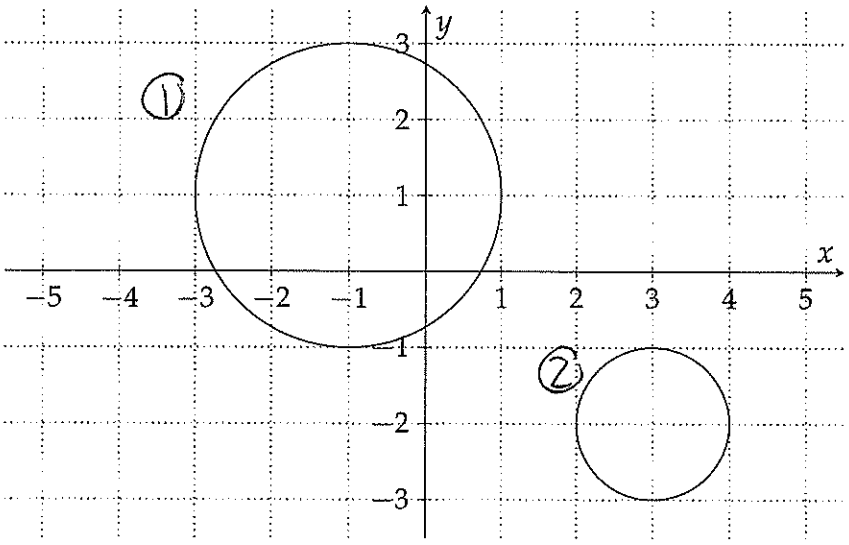
describe graphs of what shape?

Circles

Draw them both below on the axes provided.




**2.** Two circles are defined in the graph,




Write an equation for each circle depicted above.

(1) radius = 2, center = (−1, 1) $4=(x+1)^2+(y-1)^2$

(2) radius = 1, center = (3, −2) $1=(x-3)^2+(y+2)^2$

3. Determine whether the point $P$ is inside, outside, or on the circle with center $C$ and radius $r$.

a) $P(2,4), C(4,7), r = 4$

$$d(P,C) = \sqrt{(4-2)^2 + (7-4)^2}$$
$$= \sqrt{2^2 + 3^2} = \sqrt{4+9} = \sqrt{13} \quad < \sqrt{16} = 4 = r$$

Inside

b) $P(6,10), C(3,6), r = 5$

$$d(P,C) = \sqrt{(3-6)^2 + (6-10)^2}$$
$$= \sqrt{(-3)^2 + (-4)^2} = \sqrt{9+16} = \sqrt{25} = 5 = r$$

ON

c) $P(3,9), C(2,5), r = 6$

$$d(P,C) = \sqrt{(2-3)^2 + (5-9)^2}$$
$$= \sqrt{(-1)^2 + (-4)^2} = \sqrt{1+16} = \sqrt{17} \quad < \sqrt{36} = 6 = r$$

Inside

4. Solve the inequalities for $x$, putting your answers in interval notation.

a) $2x + 7 < 4x - 1$.

$-2x + 7 < -1$

$-2x < -8$

$x > 4$

$(4, \infty)$

b) $\frac{5}{5x+2} \geq 0$.

positive

5 is positive so we want to know when denominator is positive

$5x + 2 > 0$ (denominator can't $= 0$!)

$5x > -2$

$x > -\frac{2}{5}$

$\left(-\frac{2}{5}, \infty\right)$

**5.** Complete the squares to find the center and the radius of the circle.

$$x^2 + y^2 - 12x + 2y - 44 = 0$$

$x^2 - 12x + h^2 = (x-h)^2$

$x^2 - 12x + h^2 = x^2 - 2hx + h^2$

$-12x = -2hx$

$-12 = -2h$

$6 = h$

so $h^2 = 36$

$y^2 + 2y + k^2 = (y-k)^2$

$y^2 + 2y + k^2 = y^2 - 2ky + k^2$

$2y = -2ky$

$-1 = k \quad k^2 = 1$

$(x^2 - 12x + 36) + (y^2 + 2y + 1) - 36 - 1 - 44 =$

$(x-6)^2 + (y+1)^2 = 81$

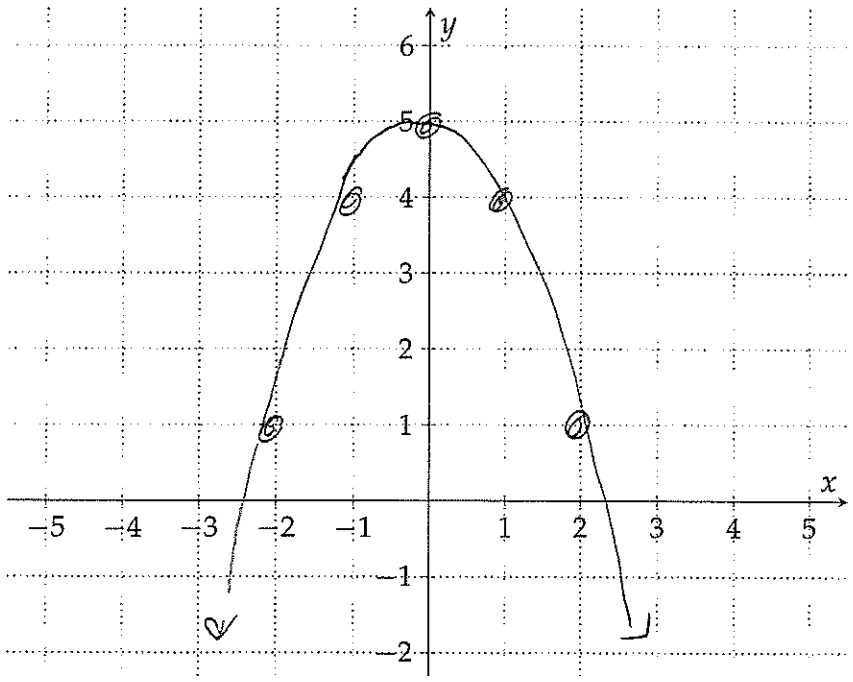
C(6, −1) ← center

r = $\sqrt{81} = 9$ ← radius

**6.** Sketch the graph of the equation,

$$y = -x^2 + 5$$

on the axes below




List any $y$-intercepts of the graph.

$y = 5$

List any $x$-intercepts of the graph.

$x = \pm\sqrt{5}$ bc this is when $0 = -x^2 + 5$.