

Honors Geometry Notes

11.5 Equations of Circles

Recall: Midpoint Formula =

Distance Formula =

Vocabulary:

The standard equation of a circle with radius r and center (h, k) is:

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

Write the standard equation of the circle described:

1. center $(4, -1)$, radius = 6

$$(x-4)^2 + (y+1)^2 = 36$$

2. center $(-1, -5)$, radius = 3.2

$$(x+1)^2 + (y+5)^2 = 10.24$$

3. center $(-2, 3)$, a point on the circle is $(2, 3)$

$$(2+2)^2 + (3-3)^2 = r^2$$

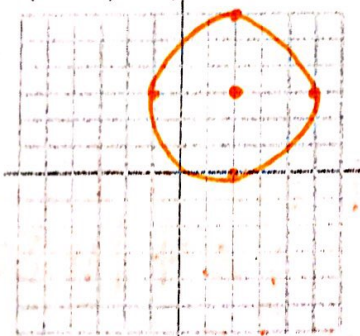
$$16 = r^2$$

$$r = 4$$

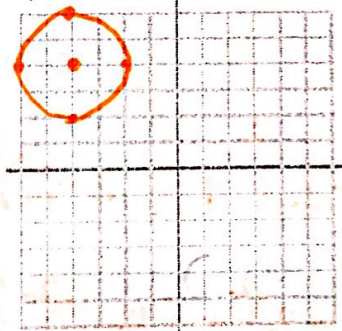
$$(x+2)^2 + (y-3)^2 = 16$$

Graph the circle that has the given equation:

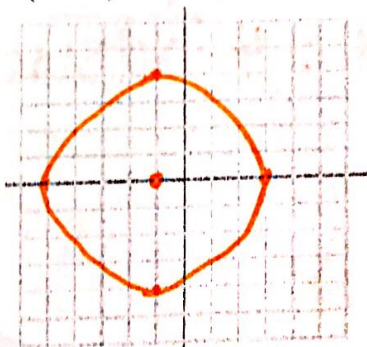
4. $(x-2)^2 + (y-3)^2 = 9$



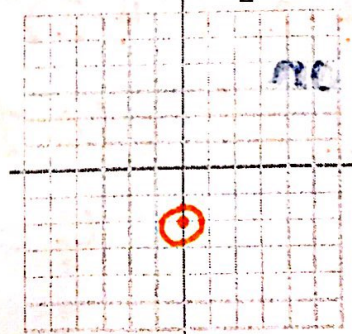
5. $(x+4)^2 + (y-4)^2 = 4$



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



7. $x^2 + (y+2)^2 = \frac{1}{2}$



Locus – set of all points in a plane that satisfy a set of given conditions

1. Draw point C. Draw and describe the locus of all points on the paper that are 3 inches from C.
2. Draw a line k . Draw and describe the locus of points on the paper that are 1 inch from the line.

Interior vs. Exterior of a Circle

Tell whether each point is inside, outside, or on the circle with equation:

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

1. $(1,2)$ $(1-2)^2 + (2-2)^2 \stackrel{?}{=} 4$ $1 + 0 \stackrel{?}{=} 4$
 $1 < 4$ **inside**
2. $(1,4)$ $(1-2)^2 + (4-2)^2 \stackrel{?}{=} 4$ $- 1 + 4 \stackrel{?}{=} 4$
 $5 > 4$ **outside**
3. $(4,4)$ $(4-2)^2 + (4-2)^2 \stackrel{?}{=} 4$ $4 + 4 > 4$ **outside**
4. $(2,0)$ $(2-2)^2 + (0-2)^2 \stackrel{?}{=} 4$
 $0 + 4 = 4$ **on**

III. Graphing Circles: must know the center and the radius

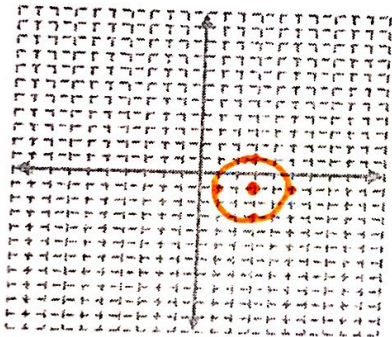
1. $(x+2)^2 + (y-3)^2 = 9$

center = $(-2, 3)$ radius = 3



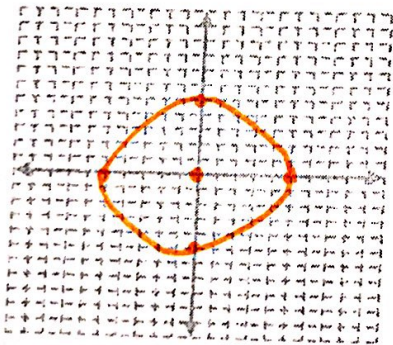
2. $(x-3)^2 + (y+1)^2 = 4$

center = $(3, -1)$ radius = 2



3. $x^2 + y^2 = 25$

center = $(0, 0)$ radius = 5



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

center = $(0, 2)$ radius = 4

