Honors Geometry

DATE: 5/15

Target 9E. Derive the equation of a circle and apply it to problems involving coordinate geometry

A **circle** is the set of all points in a plane that are a given distance from the center.

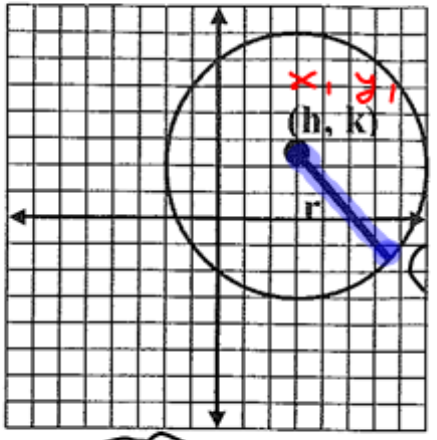
Standard Equation of a Circle
In the coordinate plane, the standard equation of a circle with center (h, k) and radius r is:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$(r)^2 = \left(\sqrt{(x-h)^2 + (y-k)^2}\right)^2$$

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

stand. Eq. of ⊙



(h, k) = center
r = radius

Write the equation of the circle.

1. (-3, 6) and radius 6

center

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

$(x-(-3))^2+(y-(6))^2=6^2$

$(x+3)^2+(y-6)^2=36$

2. (1, 2) and diameter 14

center

$(x-1)^2+(y-2)^2=7^2$

$(x-1)^2+(y-2)^2=49$

3. center at the origin and radius 9

(0,0)

center

$(x-0)^2+(y-0)^2=9^2$

$x^2+y^2=81$

Determine the coordinates of the center and the radius.

4. $(x-4)^2+(y+1)^2=121$

$(h,k)=(4,-1)$

$r^2=121 \Rightarrow r=11$

5. $(x-6)^2+(y-4)^2=9$

$(h,k)=(6,4)$

$r^2=9 \Rightarrow r=3$

6. $(x+5)^2+(y+3)^2=49$

$(h,k)=(-5,-3)$

$r^2=49 \Rightarrow r=7$

7. $x^2+y^2=64$

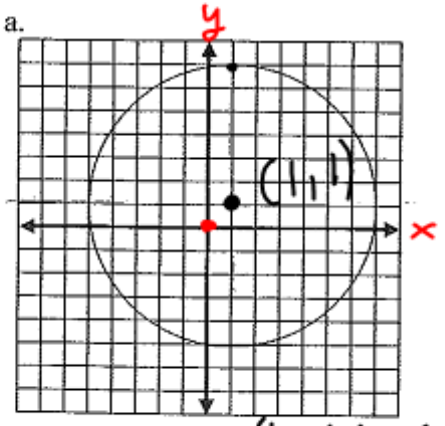
$(h,k)=(0,0)$

$r^2=64 \Rightarrow r=8$

8. Given the graph, write the equation of the circle in standard form

8. Given the graph, write the equation of the circle in standard form.

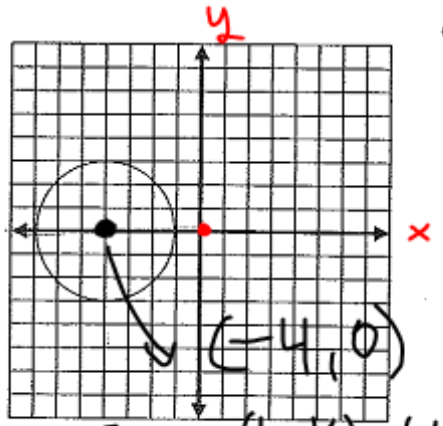
a.



$r = 6$, $(h,k) = (1,1)$

$(x-1)^2 + (y-1)^2 = 6^2 = 36$

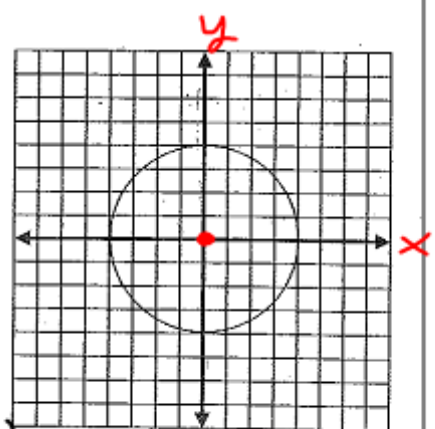
b.



$r = 3$, $(h,k) = (-4,0)$

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

c.



center $(0,0)$

$r = 4$

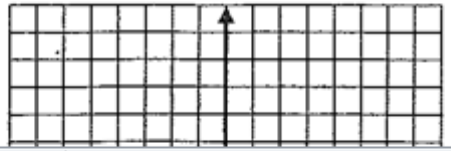
$x^2 + y^2 = 16$

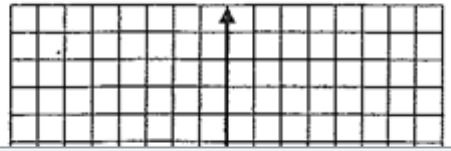
9. Graph the circle for the given equation.

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

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

c. $(x+2)^2 + (y-4)^2 = 25$

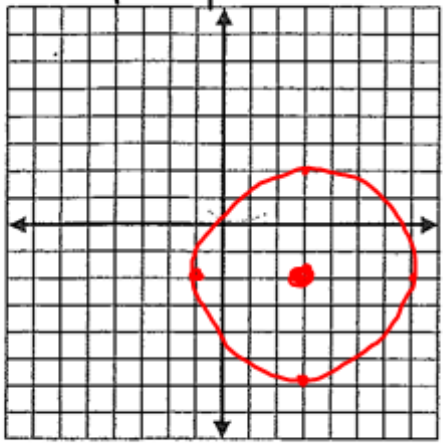




9. Graph the circle for the given equation.

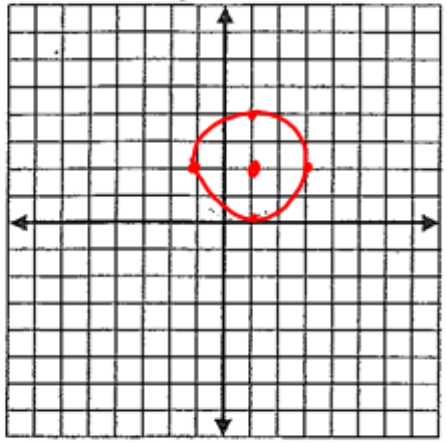
a. $(x - 3)^2 + (y + 2)^2 = 16$

Center (3, -2)
r = 4



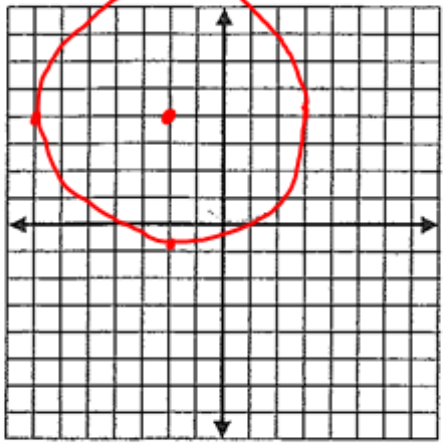
b. $(x - 1)^2 + (y - 2)^2 = 4$

Center (1, 2)
r = 2



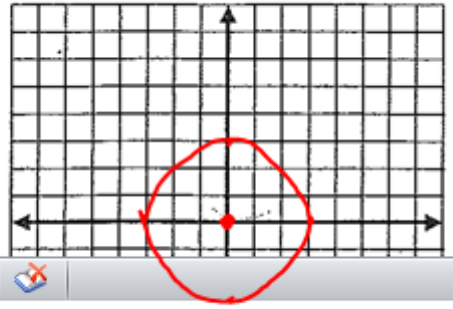
c. $(x + 2)^2 + (y - 4)^2 = 25$

Center (-2, 4)
r = 5



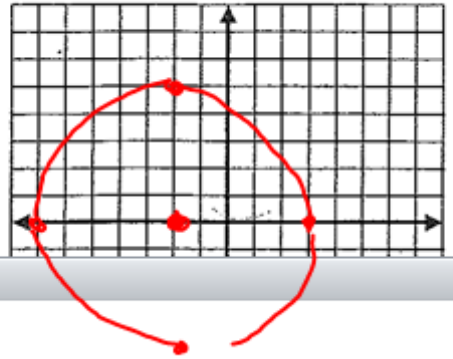
d. $x^2 + y^2 = 9$

Center (0, 0)
r = 3



e. $(x + 2)^2 + y^2 = 25$

center (-2, 0)
r = 5



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

Center (0, 1)
r = 3