Name: Key Date:

Geometry Notes CG - 6: Completing the Square

Ex: For the circle $(x-3)^2+(y+5)^2=16$, find

a. The coordinates of the center: $(3,5)$

b. The length of the radius: 4

Ex: For the circle $x^2+y^2+8x-12y+3=0$, find

a. The coordinates of the center: $(-4,6)$

b. The length of the radius: 7

Complete the square twice

① Rearrange $x^2+\underset{b}{8x}+y^2-12y=-3$

② Add $(\frac{1}{2}b)^2$ to both sides x and y

$(\frac{1}{2}8)^2$ $(\frac{1}{2}12)^2$

4^2 6^2

16 36

$x^2+8x+16+y^2-12y+36=-3+16+36$

$(x+4)(x+4)+(y-6)(y-6)=$

$(x+4)^2+(y-6)^2=49$

③ Factor Trinomials

Ex: $x^2+y^2-6y-16=0$

$x^2+y^2-6y=16$ $(\frac{1}{2}(6))^2$

$x^2+y^2-6y+9=16+9$ $3^2=9$

$x^2+(y-3)(y-3)=25$

$x^2+(y-3)^2=25$

Center $(0,3)$

$r=5$