Name: KEY Date: ______ Per: ______

W/S AA4-16 Complete the Square Practice

The standard form equation of a circle is $(x-h)^2+(y-k)^2=r^2$ **where the center is at** (h, k) **and the radius is** r**.**

1) These circles are in standard form. Find the center and radius of each.

Equation	**Center**	**Radius**
a) $(x+3)^2+(y+10)^2=64$	$(-3,-10)$	8
b) $(x-7)^2+(y-1)^2=81$	$(7,1)$	9
c) $(x-4)^2+y^2=1$	$(4,0)$	1

2) Write the standard form equation of the circle with the given center and radius.

Equation	**Center**	**Radius**
a) $(x+12)^2+(y-7)^2=16$	(-12, 7)	4
b) $(x-5)^2+(y+6)^2=49$	(5, -6)	7
c) $x^2+(y-5)^2=4$	(0, 5)	2

3) These circles are in general form, so they "look bad", but they're "all there". Factor the left side (twice) and write in standard form. Then find the center and radius.

Equation	
a) $x^2-10x+25+y^2+4y+4=100$ $(x-5)^2+(y+2)^2=100$	**Center:** $(5,-2)$ **Radius:** 10
b) $x^2+8x+16+y^2-20y+100=4$ $(x+4)^2+(y-10)^2=4$	**Center:** $(-4,10)$ **Radius:** 2
c) $x^2-22x+121+y^2-2y+1=25$ $(x-11)^2+(y-1)^2=25$	**Center:** $(11,1)$ **Radius:** 5
d) $x^2+20x+y^2+2y+101=25$ $(x+10)^2+(y+1)^2=25$ The 10^2 and 1^2 were combined in 101.	**Center:** $(-10,-1)$ **Radius:** 5

4) These circles are in general form, but they're **NOT QUITE** "all there". Determine what's missing and adjust the equation. Then continue as in #3.

Equation	
a) $x^2+8x+14+y^2+20y+99=22$ $(x+4)^2-2+(y+10)^2-1=22$ $4^2=16$, but I only had 14, so I need 2 more $10^2=100$ $99-100=-1$ $(x+4)^2+(y+10)^2=25$	**Center:** $(-4,-10)$ **Radius:** 5
b) $x^2+16x+60+y^2+6y+7=19$ $(x+8)^2-4+(y+3)^2-2=19$ $+4$ $+2$ $+4$ $+2$ $(x+8)^2+(y+3)^2=25$	**Center:** $(-8,-3)$ **Radius:** 5
c) $x^2-20x+90+y^2-10y+24=110$ $(x-10)^2-10+(y-5)^2-1=110$ $+10$ $+1$ $+10$ $+1$ $(x-10)^2+(y-5)^2=121$	**Center:** $(10,5)$ **Radius:** 11
d) $x^2+6x+y^2+12y=19$ $(x+3)^2-9+(y+6)^2-36=19$ $+9$ $+36$ $+9$ $+36$ $(x+3)^2+(y+6)^2=64$	**Center:** $(-3,-6)$ **Radius:** 8

5) This process of adjusting the equation so the left side contains two PERFECT SQUARES is called <u>Completing the Square</u>. Here are a few more:

Equation			
a) $x^2+6x+y^2+10y=2$ $(x+3)^2-9+(y+5)^2-25=2$ $(x+3)^2+(y+5)^2=36$	**Center:** $(-3,-5)$ **Radius:** 6	d) $x^2-10x+y^2+16y=-8$ $(x-5)^2-25+(y+8)^2-64=-8$ $(x-5)^2+(y+8)^2=81$	**Center:** $(5,-8)$ **Radius:** 9
b) $x^2+12x+y^2+2y=12$ $(x+6)^2-36+(y+1)^2-1=12$ $(x+6)^2+(y+1)^2=49$	**Center:** $(-6,-1)$ **Radius:** 7	e) $x^2+6x+y^2+14y=6$ $(x+3)^2-9+(y+7)^2-49=6$ $(x+3)^2+(y+7)^2=64$	**Center:** $(-3,-7)$ **Radius:** 8
c) $x^2-4x+y^2-6y=-4$ $(x-2)^2-4+(y-3)^2-9=-4$ $(x-2)^2+(y-3)^2=9$	**Center:** $(2,3)$ **Radius:** 3	f) $x^2+y^2-20y=-99$ $x^2+(y-10)^2-100=-99$ $x^2+(y-10)^2=1$	**Center:** $(0,10)$ **Radius:** 1