Geometry **Completing the Square Review and Circle Equations Worksheet 2**

Recall: Circle Equation in Standard Form: $(x-h)^2+(y-k)^2=r^2$ **Center: (h, k)** **Radius: r**

Write the below equations in standard form, then identify center and radius of circle:

1) $x^2+y^2+14x-22y+150=0$

2) $x^2+y^2-2x+16y-16=0$

3) $x^2+y^2-4x-18y+60=0$

4) $x^2+y^2-26x-16y+229=0$

5) $x^2+y^2+20x+32y+351=0$

6) $x^2+y^2-6x+24y+128=0$

7) $x^2 + y^2 + 10x + 24y + 165 = 0$

8) $x^2 + y^2 - 6x - 4y - 75 = 0$

9) $x^2 + y^2 - 6x - 2y - 134 = 0$

10) $x^2 + y^2 + 12x - 16y + 85 = 0$

11) $x^2 + y^2 - 32x - 18y + 333 = 0$

12) $x^2 + y^2 - 26x - 16y + 217 = 0$

13) $x^2 + y^2 - 24x + 30y + 365 = 0$

14) $y^2 - 75 + x^2 = 100 - 30y$

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Key

Recall: Circle Equation in Standard Form: $(x-h)^2+(y-k)^2=r^2$ **Center: (h, k)** **Radius: r**

Write the below equations in standard form, then identify center and radius of circle:

1) $x^2+y^2+14x-22y+150=0$

$x^2+14x+\underline{49}+y^2-22y+\underline{121}=-150+\underline{49}+\underline{121}$

	x	+7
x		
+7		49

	y	-11
y		
-11		121

$(x+7)^2+(y-11)^2=20$

C: $(-7,11)$ $r=\sqrt{20}=2\sqrt{5}$

2) $x^2+y^2-2x+16y-16=0$

$x^2-2x+\underline{1}+y^2+16y+\underline{64}=16+\underline{1}+\underline{64}$

	x	-1
x		
-1		1

	y	+8
y		
+8		

$(x-1)^2+(y+8)^2=81$

C: $(1,-8)$ $r=9$

3) $x^2+y^2-4x-18y+60=0$

$x^2-4x+\underline{4}+y^2-18y+\underline{81}=-60+\underline{4}+\underline{81}$

	x	-2
x		
-2		4

	y	-9
y		
-9		81

$(x-2)^2+(y-9)^2=25$

C: $(2,9)$ $r=5$

4) $x^2+y^2-26x-16y+229=0$

$x^2-26x+\underline{169}+y^2-16y+\underline{64}=-229+\underline{169}+\underline{64}$

	x	-13
x		
-13		169

	y	-8
y		
-8		64

$(x-13)^2+(y-8)^2=4$

C: $(13,8)$ $r=2$

5) $x^2+y^2+20x+32y+351=0$

$x^2+20x+\underline{100}+y^2+32y+\underline{256}=-351+\underline{100}+\underline{256}$

	x	10
x	x^2	
10		100

	y	+16
y		
+16		

$(x+10)^2+(y+16)^2=5$

C: $(-10,-16)$ $r=\sqrt{5}$

6) $x^2+y^2-6x+24y+128=0$

$x^2-6x+\underline{9}+y^2+24y+\underline{144}=-128+\underline{9}+\underline{144}$

	x	-3
x		
-3		9

	y	12
y		
12		144

$(x-3)^2+(y+12)^2=25$

C: $(3,-12)$ $r=5$

7) $x^2 + y^2 + 10x + 24y + 165 = 0$

$x^2 + 10x + \underline{25} + y^2 + 24y + \underline{144} = -165 + \underline{25} + \underline{144}$

	x	$+5$
x		
$+5$		25

	y	$+12$
y		
12		144

$(x+5)^2 + (y+12)^2 = 4$

$C: (-5, -12) \quad r = 2$

8) $x^2 + y^2 - 6x - 4y - 75 = 0$

$x^2 - 6x + \underline{9} + y^2 - 4y + \underline{4} = 75 + \underline{9} + \underline{4}$

	x	-3
x		
-3		9

	y	-2
y		
-2		4

$(x-3)^2 + (y-2)^2 = 88$

$C: (3, 2) \quad r = \sqrt{88}$

9) $x^2 + y^2 - 6x - 2y - 134 = 0$

$x^2 - 6x + \underline{9} + y^2 - 2y + \underline{1} = 134 + \underline{9} + \underline{1}$

	x	-3
x		
-3		9

	y	-1
y		
-1		1

$(x-3)^2 + (y-1)^2 = 144$

$C: (3, 1) \quad r = 12$

10) $x^2 + y^2 + 12x - 16y + 85 = 0$

$x^2 + 12x + \underline{36} + y^2 - 16y + \underline{64} = -85 + \underline{36} + \underline{64}$

	x	6
x		
6		36

	y	-8
y		
-8		64

$(x+6)^2 + (y-8)^2 = 15$

$C: (-6, 8) \quad r = \sqrt{15}$

11) $x^2 + y^2 - 32x - 18y + 333 = 0$

$x^2 - 32x + \underline{256} + y^2 - 18y + \underline{81} = -333 + \underline{256} + \underline{81}$

	x	-16
x		
-16		256

	y	-9
y		
-9		81

$(x-16)^2 + (y-9)^2 = 4$

$C: (16, 9) \quad r = 2$

12) $x^2 + y^2 - 26x - 16y + 217 = 0$

$x^2 - 26x + \underline{169} + y^2 - 16y + \underline{64} = -217 + \underline{169} + \underline{64}$

	x	-13
x		
-13		169

	y	-8
y		
-8		64

$(x-13)^2 + (y-8)^2 = 16$

$C: (13, 8) \quad r = 4$

13) $x^2 + y^2 - 24x + 30y + 365 = 0$

$x^2 - 24x + \underline{144} + y^2 + 30y + \underline{225} = -365 + \underline{144} + \underline{225}$

	x	-12
x		
-12		144

	y	$+15$
y		
$+15$		225

$(x-12)^2 + (y+15)^2 = 4$

$C: (12, -15) \quad r = 2$

14) $y^2 - 75 + x^2 = 100 - 30y$

$x^2 + y^2 + 30y + \underline{225} = 100 + 75 + \underline{225}$

	y	15
y		
$+15$		225

$x^2 + (y+15)^2 = 400$

$(x-0)^2 + (y+15)^2 = 400$

$C: (0, -15) \quad r = 20$