

1. Write an equation of a circle with a radius of 8 and a center of (4, 3).  $(x-4)^2 + (y-3)^2 = 64$

2. Write an equation of a circle with a radius of 6 and a center of (-3, -8).  $(x+3)^2 + (y+8)^2 = 36$

3. Write the equation of a circle given the center is (2, -5) with a radius of 7.  $(x-2)^2 + (y+5)^2 = 49$

4. Find the center and radius.  $(x-1)^2 + (y+4)^2 = 81$   
Center (1, -4) r = 9

5. Find the radius and center of:  $(x-5)^2 + (y-2)^2 = 20$   
Center (5, 2) r =  $\sqrt{20} = 2\sqrt{5}$

6. Convert to general form.  $(x-2)^2 + (y+3)^2 = 9$   
 $(x-2)(x-2) + (y+3)(y+3) = 9$   
 $x^2 - 4x + 4 + y^2 + 6y + 9 = 9$   
 $x^2 - 4x + y^2 + 6y + 4 = 0$   
Center (2, -3) r = 3

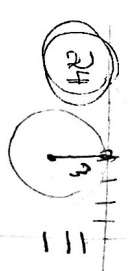
7. Convert to general form.  $(x+4)^2 + (y-2)^2 = 1$   
 $(x+4)(x+4) + (y-2)(y-2) = 1$   
 $x^2 + 8x + 16 + y^2 - 4y + 4 = 1$   
 $x^2 + 8x + y^2 - 4y + 19 = 0$   
Center (-4, 2) r = 1

8. Convert to standard form, then find the center and radius.  $x^2 - 8x + y^2 + 11 = 0$   
 $x^2 - 8x + y^2 = -11$   
 $(x-4)^2 + (y+0)^2 = 5$   
Center (4, 0) r =  $\sqrt{5}$

9. Convert to standard form, then find the center and radius.  $x^2 + y^2 + 4x - 6y = -4$   
 $x^2 + 4x + y^2 - 6y = -4$   
 $(x+2)^2 + (y-3)^2 = 9$   
Center (-2, 3) r = 3

10. Convert to standard form, then find the center and radius.  $3x^2 - 9 - 3y^2 - 6y$   
 $3x^2 + 3y^2 + 6y - 9 = 0$   
 $3(x^2 + y^2 + 2y - 3) = 0$   
 $x^2 + y^2 + 2y = 3$   
Center (0, -1) r =  $\sqrt{3}$

$(x+0)^2 + (y+1)^2 = 3$   
Center (0, -1) r =  $\sqrt{3}$



**Example 5:** Write an equation of a circle whose diameter has endpoints (3, 5) and (6, 1).  
midpoint of diameter is the center of the circle; diameter = 2 \* radius,

Use midpoint formula to find the center:  $\left(\frac{3+6}{2}, \frac{5+1}{2}\right) = \left(\frac{9}{2}, 3\right)$

Use distance formula to find the diameter:  $d = \sqrt{(6-3)^2 + (1-5)^2} = \sqrt{9+16} = 5$   
Radius is 1/2 the diameter:  $r = \frac{5}{2}$

Use the center and radius to write the equation in standard form:  
 $(x - \frac{9}{2})^2 + (y - 3)^2 = \frac{25}{4}$

**Practice:**  
11. Write an equation of a circle whose diameter has endpoints (2, 8) and (2, -2).  
Center  $(\frac{2+2}{2}, \frac{8+(-2)}{2}) = (\frac{4}{2}, \frac{6}{2}) = (2, 3)$   
Diameter  $d = \sqrt{(2-2)^2 + (-2-8)^2} = \sqrt{0+100} = \sqrt{100} = 10$   
Radius =  $\frac{10}{2} = 5$   
Equation:  $(x-2)^2 + (y-3)^2 = 25$

12. Write an equation for a circle with center (7, 7) that passes through (12, 9).  
Center  $(\frac{12+7}{2}, \frac{9+7}{2}) = (\frac{19}{2}, \frac{16}{2}) = (\frac{19}{2}, 8)$   
Diameter  $d = \sqrt{(12-7)^2 + (9-7)^2} = \sqrt{25+4} = \sqrt{29}$   
Radius =  $\frac{\sqrt{29}}{2}$   
Equation:  $(x - \frac{19}{2})^2 + (y - 8)^2 = \frac{29}{4}$

13. Write an equation for a circle with center (-4, -3) that is tangent to the x-axis.  
Equation:  $(x+4)^2 + (y+3)^2 = 9$