

Quiz Review: Circles and Ellipses

1. Write the equation in standard form. What is the center and radius of the circle?  $25x^2 + 25y^2 = 100$

EQ:  $x^2 + y^2 = 4$

Center:  $(0,0)$  radius:  $2$

$$\frac{25x^2}{25} + \frac{25y^2}{25} = \frac{100}{25}$$

$$x^2 + y^2 = 4$$

2. Find the center and radius for the circle whose equation is:  $(x + 7)^2 + (y - 15)^2 = 37$

Center:  $(-7, 15)$

Radius:  $\sqrt{37}$

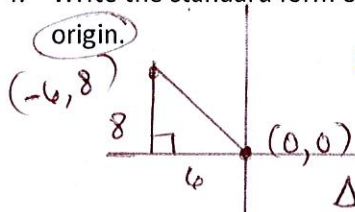
3. Write the standard form of the equation of the circle with radius of  $\sqrt{65}$  and center at the origin.

$$x^2 + y^2 = r^2$$

$$x^2 + y^2 = (\sqrt{65})^2$$

$$x^2 + y^2 = 65$$

4. Write the standard form of the equation of the circle that passes through  $(-6, 8)$  and whose center is at the origin.



option 1

$$6^2 + 8^2 = c^2$$

$$36 + 64 = c^2$$

$$c^2 = 100$$

(use for  $r^2$  in equation)

$$x^2 + y^2 = 100$$

Graph the Ellipse. Name the center, vertices, co-vertices, e, and foci.

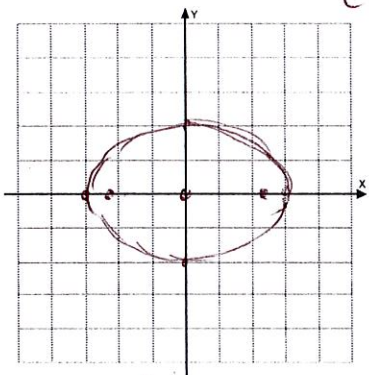
5a.  $\frac{x^2}{9} + \frac{y^2}{4} = 1$

$$c^2 = 9 - 4$$

$$c^2 = 5$$

$$c = \sqrt{5}$$

$$c \approx 2.2$$



Center:  $(0,0)$

Vertices:  $(0 \pm 3, 0) \rightarrow (3,0), (-3,0)$

Co-Vertices:  $(0, 0 \pm 2) \rightarrow (0,2), (0,-2)$

Foci:  $(0 \pm \sqrt{5}, 0) \rightarrow (\sqrt{5},0), (-\sqrt{5},0)$

b.  $\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$

Distance equation

$$d = \sqrt{(8-0)^2 + (0-6)^2}$$

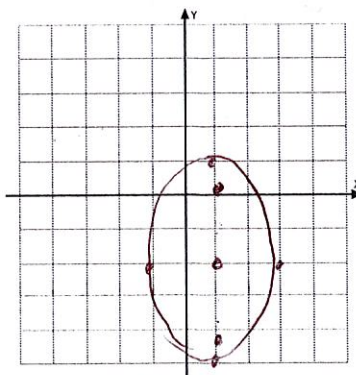
$$d = \sqrt{8^2 + 6^2}$$

$$d = \sqrt{64 + 36}$$

$$d = \sqrt{100}$$

$$d = 10$$

(length of radius)



Center:  $(1, -2)$

Vertices:  $(1, -2 \pm 3) \rightarrow (1,1), (1,-5)$

Co-Vertices:  $(1 \pm 2, -2) \rightarrow (3,-2), (-1,-2)$

Foci:  $(1, -2 \pm \sqrt{5})$

$$c^2 = 9 - 4$$

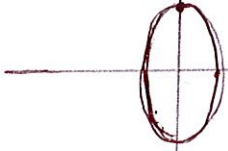
$$c^2 = 5$$

$$c = \sqrt{5}$$

6. Write the equation of each ellipse with the given characteristics and center at (0, 0).

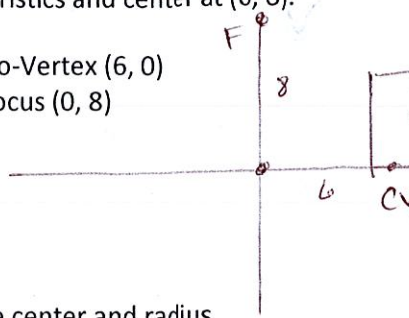
a. Vertex (0, 6)  
Co-Vertex (3, 0)

$$\frac{x^2}{9} + \frac{y^2}{36} = 1$$



b. Co-Vertex (6, 0)  
Focus (0, 8)

$$\frac{x^2}{36} + \frac{y^2}{100} = 1$$



belongs on minor axis

$$b = 6, c = 8$$

$$c^2 = a^2 - b^2$$

$$8^2 = a^2 - 6^2$$

$$64 = a^2 - 36$$

$$100 = a^2$$

7. Write the equation in standard form for the circle. Find the center and radius

$$x^2 + 2x + y^2 - 10y + 10 = 0$$

Eq:  $(x+1)^2 + (y-5)^2 = 16$

Center:  $(-1, 5)$  Radius:  $r = 4$

$$x^2 + 2x + 1 + y^2 - 10y + 25 = -10 + 1$$

$$(x+1)^2 + (y-5)^2 = 16 + 25$$

8. Write the equation in standard form for the ellipse. Find the center, vertices, co-vertices and foci.

$a^2 = 81$   
 $\therefore a = 9$

$$x^2 + 9y^2 + 6x - 108y + 252 = 0$$

$$\frac{(x+3)^2}{81} + \frac{(y-6)^2}{9} = 1$$

$$x^2 + 6x + 9 + 9y^2 - 108y = -252$$

$$x^2 + 6x + 9 + 9(y^2 - 12y + 36) = -252$$

$$(x+3)^2 + 9(y-6)^2 = 81 - 252 + 324$$

$$\frac{(x+3)^2}{81} + \frac{(y-6)^2}{9} = 1$$

Center:  $(-3, 6)$  Vertices:  $(-3, 6+9)$  and  $(-3, 6-9)$   
 $(6, 6)$  and  $(-12, 6)$

Co-Vertices:  $(-3, 6+3)$  and  $(-3, 6-3)$   
 $(-3, 9)$  and  $(-3, 3)$  Foci:  $(-3 \pm 6\sqrt{2}, 6)$

e = \_\_\_\_\_

$$c^2 = 81 - 9$$

$$c^2 = 72$$

$$c = 6\sqrt{2} \text{ or } \approx 8.5$$

9. Solve the system of equations

$$x^2 + y^2 = 20$$

$$y = 2x - 10$$

one solution  $(4, -2)$

$$x^2 + (2x - 10)^2 = 20$$

$$x^2 + (2x - 10)(2x - 10) = 20$$

$$x^2 + 4x^2 - 20x - 20x + 100 = 20$$

$$y = 2(4) - 10$$

$$y = 8 - 10$$

$$y = -2$$

$$5x^2 - 40x + 80 = 0$$

$$5(x^2 - 8x + 16) = 0$$

$$x^2 - 8x + 16 = 0$$

$$(x-4)(x-4) = 0$$

$$x = 4$$