**Algebra II Worksheet Parabola, Circle, and Ellipse**
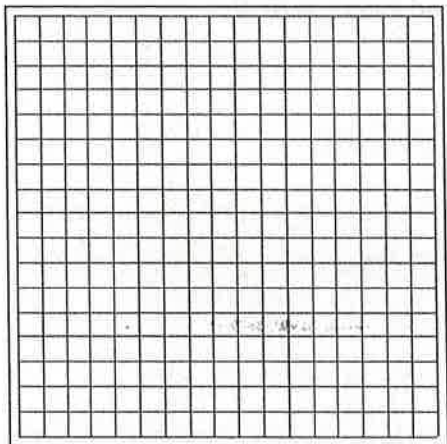
Name_____

Period_____

1. Find the focus of the parabola: $y^2 = -8x$

   $x = -\frac{1}{8}y^2$

   $(0, -2)$

2. Identify the focus and directrix of the parabola given by $y^2 = -4x$.

   $x = -\frac{1}{4}y^2$

   $(0, -1)$     $y = 1$

3. Identify the focus and directrix of the parabola given by $x^2 = 12y$.

   $(3, 0)$     $x = -3$

4. Graph the parabola. $y^2 - 8x = 0$ Include the vertex, focus, directrix, and four points other than the vertex.

   $y = \sqrt{8x}$

   $y = -\sqrt{8x}$

   $(0, 0)$     focus  $(-2, 0)$

   directrix   $(0, -2)$

   $x = 2$        $h\ k$                $c$

5. Write the standard form of the equation of the parabola with its vertex at (0, 0) and focus at (0, –4)   $0 + c = -4$

   $y = \frac{1}{-16}x^2$

   $h\ k$

6. Write the standard form of the equation of the parabola with its vertex at (0, 0) and directrix $y = 5$.

   $y = -\frac{1}{20}x^2$     $k - c = 5$

7. Write the standard form of the equation of the parabola with its vertex at (0, 0) and directrix $x = 2$.

   $x = -\frac{1}{8}y^2$     $h - c = 2$

8. Suppose a parabola has vertex $(0, 0)$ and the distance from the vertex to the focus is 5 units. How many possible parabolas fit this description? Write the equations of all the possible parabolas that fit this description.

9. Sketch the graph of $x^2 + y^2 = 49$. Give the center and 4 points on the circle.
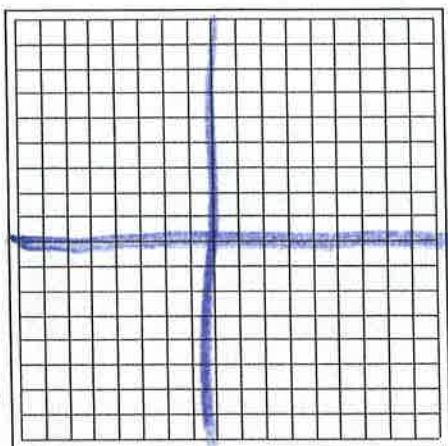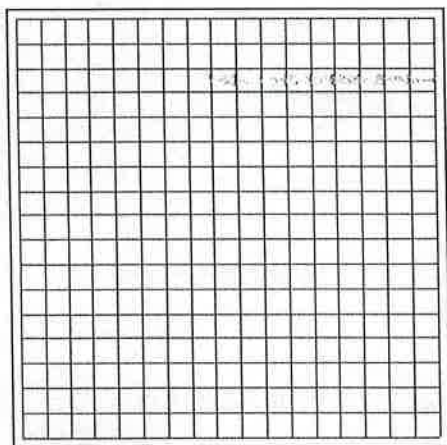
$(0, 7)$

$(0, -7)$

$(-7, 0)$

$(7, 0)$

10. Write the standard form of the equation of the circle with radius 6 and center at (0, 0)

$x^2 + y^2 = 36$

11. Sketch the graph of $2x^2 + 2y^2 = 32$. Give the center and 4 points on the circle.

$\frac{\phantom{x}}{2}$

$x^2 + y^2 = 16$

$(0, \pm 4)$

$(\pm 4, 0)$

12. Write the standard form of the equation of the circle that passes through the point (0, 1) with its center at the origin.

$r = \sqrt{(0-0)^2 + (0-1)^2} = \sqrt{1} = 1$

$x^2 + y^2 = 1^2$

13. Write the standard form of the equation of the circle that passes through the point (3, 4) with its center at the origin.

$r = \sqrt{(0-3)^2 + (0-4)^2}$

$x^2 + y^2 = 5^2$

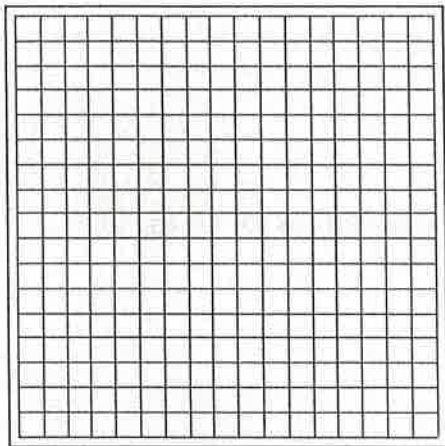14. Write the standard form of the equation of the circle that passes through the point (1, −6) with its center at the origin.
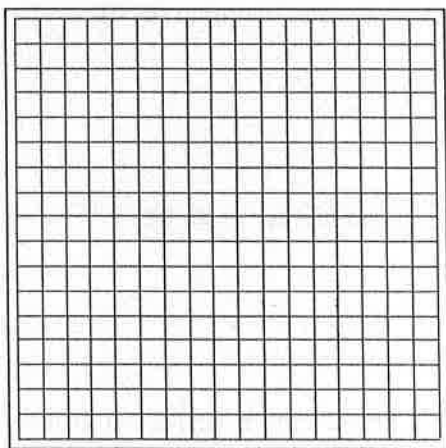
$x^2 + y^2 = \sqrt{37}^2 \quad = \quad x^2 + y^2 = 37$

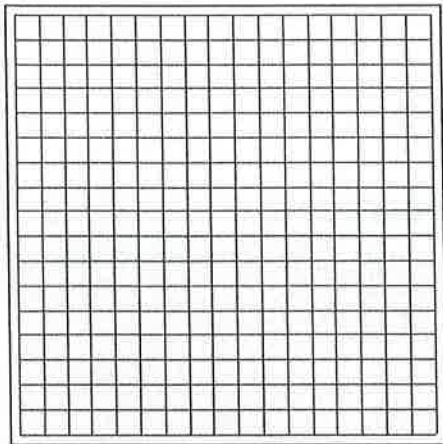15. Determine the foci, vertices, and covertices of the graph of $\frac{x^2}{9} + \frac{y^2}{16} = 1$

16. Sketch the graph of $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Include the vertices, covertices, and foci.

17. Sketch the graph of $\frac{x^2}{4} + \frac{y^2}{9} = 1$. Include the vertices, covertices, and foci.

18. Sketch the graph of $16x^2 + y^2 = 16$. Include the vertices, covertices, and foci.



19. Write an equation of an ellipse with vertices of (–7, 0) and (7, 0), and co-vertices (0, –4) and (0, 4).

20. Write an equation of the ellipse with a vertex at (9, 0), a co-vertex at (0, 5), and center at (0, 0.

21. Write an equation of the ellipse with a vertex at (0, 8), a co-vertex at (4, 0), and center at (0, 0).

22. Write an equation of the ellipse with a vertex at (5, 0), a focus at (4, 0), and center at (0, 0).

23. Writing: How is the equation of an ellipse like the equation of a circle? How are the equations different?