

MATH 1650: TEST 04 (100 points.)

NAME: _____

DIRECTIONS: To receive full credit, make sure your work is neat and complete.

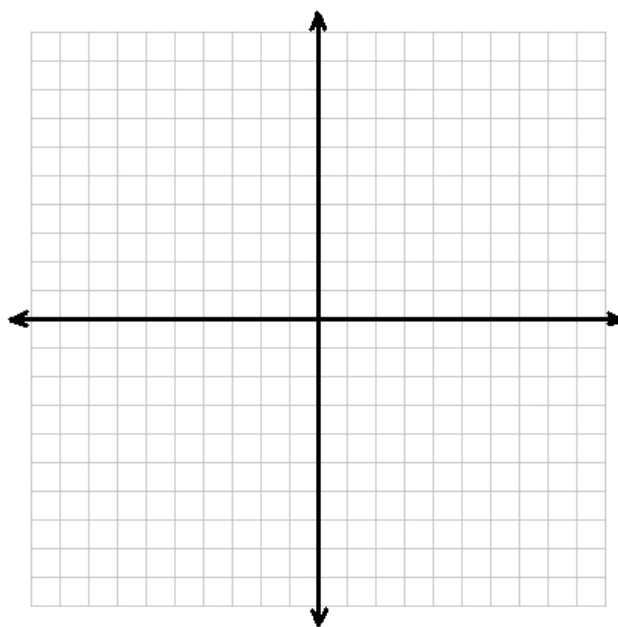
1. Find the equation of the circle which has $(3, -2)$ and $(0, 2)$ as endpoints of a diameter.

2. Graph $f(x) = \sqrt{8x - 4x^2}$ by proving the graph is part of an ellipse.

Put the ellipse into standard form and indicate which part of the graph of the ellipse is the graph of f .

STANDARD FORM:

GRAPH:



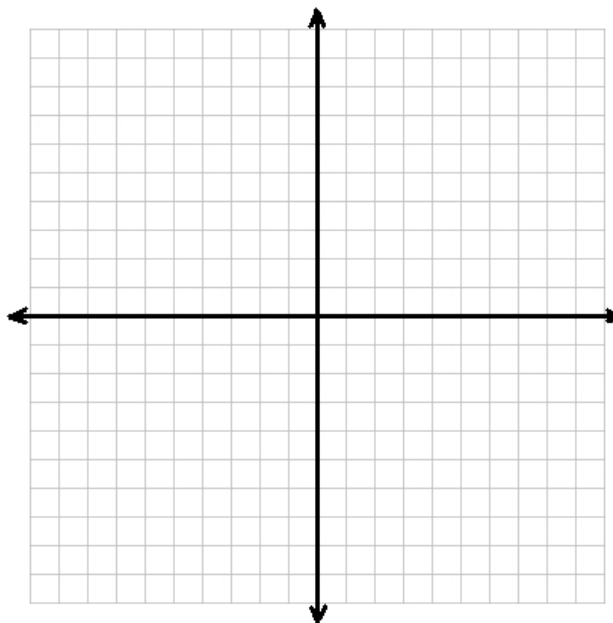
3. Put the following equation in standard form and graph: $25y^2 - 4x^2 - 16x = 116$.

STANDARD FORM:

CENTER:

VERTICES:

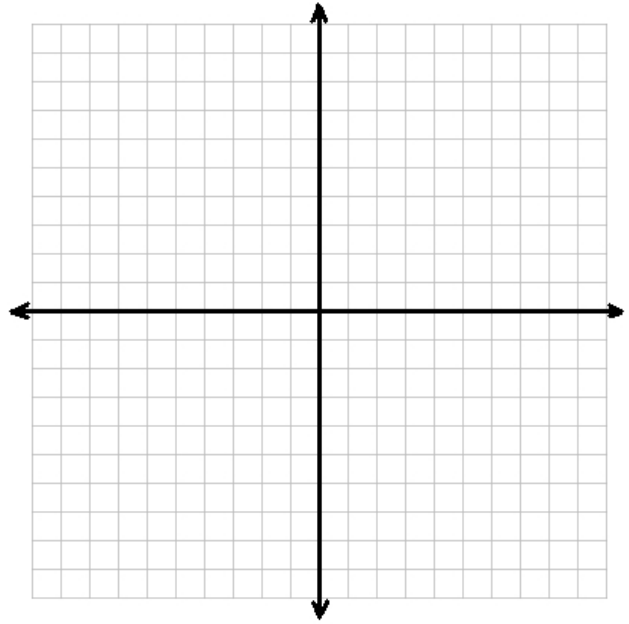
ASYMPTOTES:



4. A parabolic Wi-Fi antenna is constructed by taking a flat sheet of metal and bending it into a parabolic shape. If the cross section of the antenna is a parabola which is 45 centimeters wide and 25 centimeters deep, where should the receiver be placed to maximize reception?

5. Consider the system:
$$\begin{cases} x^2 - y = 4 \\ 9x + 2y = 3 \end{cases}$$

(a) Graph both equations on the same set of axes. How many solutions do you expect for this system?



(b) Solve this system algebraically.

6. Write out the first four terms of the following sequences.

Determine if they are arithmetic, geometric, or neither, and explain your reasoning.

- If the sequence is arithmetic, find the common difference, d .
- If the sequence is geometric, find the common ratio, r .

(a) $a_n = 6 - 2n, n \geq 0$.

(b) $b_1 = 3, b_{k+1} = (-2)b_k, k \geq 1$.

7. Find an explicit formula for the n th term of the sequence: $1, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \dots$

8. Write out the sum to find its value: $\sum_{n=0}^3 \frac{(-1)^n}{(2n)!}$

9. How many ways can skippy choose 5 of his 7 songs to put on a playlist ?

10. Use Pascal's Triangle to expand: $(\sqrt[3]{x} - 2)^3$.