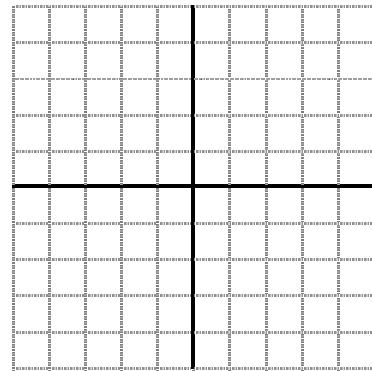


**Math 173 – Assignment #2****Name:** \_\_\_\_\_

1. For  $f(x) = \frac{1}{x} + 3$  and  $g(x) = \frac{1}{x-3}$ , find  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .

2. Sketch the graph of the following function. Include at least two accurate points on your graph.

$$f(x) = 2 - \sqrt{-x}$$



3. Write an equation for a function that has a graph with the shape of  $y = |x|$  but upside-down and shifted left 1 unit and down 3 units.

4. Is the function  $f(x) = \frac{x}{x^2 + 1}$  even, odd, or neither even nor odd? Show your work.

5. Calculate the difference quotient  $\frac{f(x+h) - f(x)}{h}$  for the function  $f(x) = 5x^2$ .

6. Find the vertex for the following parabola. Is the vertex at the maximum or minimum point in the parabola?

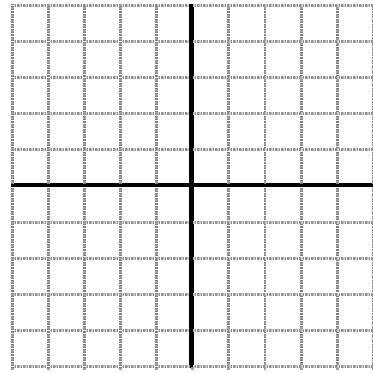
$$f(x) = \frac{1}{4}x^2 + 3x - 3$$

\_\_\_\_\_

\_\_\_\_\_

7. Rewrite the equation of the following parabola in the form  $f(x) = a(x-h)^2 + k$  by completing the square. Then state the axis of symmetry and the coordinates of the vertex, and sketch the graph (as accurately as possible!).

$$f(x) = -\frac{1}{2}x^2 + 2x + 1$$



equation: \_\_\_\_\_

vertex: \_\_\_\_\_

axis of symmetry: \_\_\_\_\_

8. Factor the following polynomial into linear factors.

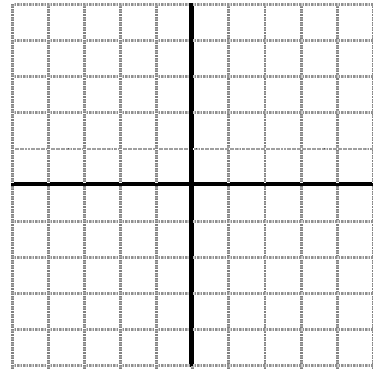
$$f(x) = x^3 - 4x - 15$$

\_\_\_\_\_

9. Consider the following polynomial:

$$f(x) = -(x+1)^2(x-1)^2(x-3)$$

- a) Find the zeros of this polynomial and their multiplicities.
  
  
  
  
  
  
  
  
  
  
- b) Find the y-intercept.
  
  
  
  
  
  
  
  
  
  
- c) Sketch the graph.



10. Use the Rational Zeros Theorem to list all possible rational zeros of  $f(x)$ .

$$f(x) = 4x^5 - 3x^3 + 5x^2 - 6$$

11. Using Descartes' Rule, how many positive real zeros and negative real zeros can the following polynomial have? Do not solve it!

$$f(x) = x^5 + 5x^4 + x^3 - 3x^2 + 4x + 7$$

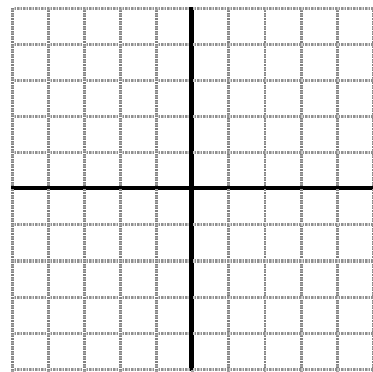
positive real zeros: \_\_\_\_\_

negative real zeros: \_\_\_\_\_

12. Consider the following rational function:

$$f(x) = \frac{x^2}{x^2 - 4}.$$

- a) What is the y-intercept?
- b) What are the x-intercepts?
- c) Are there any vertical asymptotes? If so, where?
- d) Are there any horizontal asymptotes? If so, where?
- e) Are there any slant asymptotes? If so, where?
- f) Sketch the graph as accurately as possible.



13. A fourth-grade class decides to enclose a rectangular garden and then divide the garden into two sections by an additional piece of fence, as shown in the diagram. What is the maximum area that the class can enclose with 24 feet of fence?

