

April 2000

Your name _____

Problems count 5 points each.

1. Find equations for all vertical and horizontal asymptotes of the function

$$R(x) = \frac{x^4 + x^2 - 6}{2x^4 - 54x}.$$

2. Solve the equation $3(2x - 5(x - 1) + 7x) = 15$.

3. Solve $x - 3/x = 6$.

4. What is the smallest root of $2x^3 + x^2 - 7x = 0$?

5. Let

$$f(x) = \begin{cases} 2x - 1 & \text{if } x < 0 \\ x + 3 & \text{if } 0 \leq x \end{cases} \quad \text{and } g(x) = |x| - 4$$

Find a symbolic representation of $g \circ f(x)$.

6. Solve $-3 < 2x - 1 < 5$.

7. Find the vertex and sketch the graph of $y = x^2 + 2x + 4$.

8. What is the domain of

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

9. Find the center and the radius of the circle given by

$$x^2 + 6x + y^2 - 4y = -4.$$

10. What is the midpoint of the line segment from $(3, -6)$ to $(5, 12)$?

11. Suppose g is defined by $g(x) = (4 - x)/6$. Let f be the inverse of the function g . Find a symbolic representation of f .