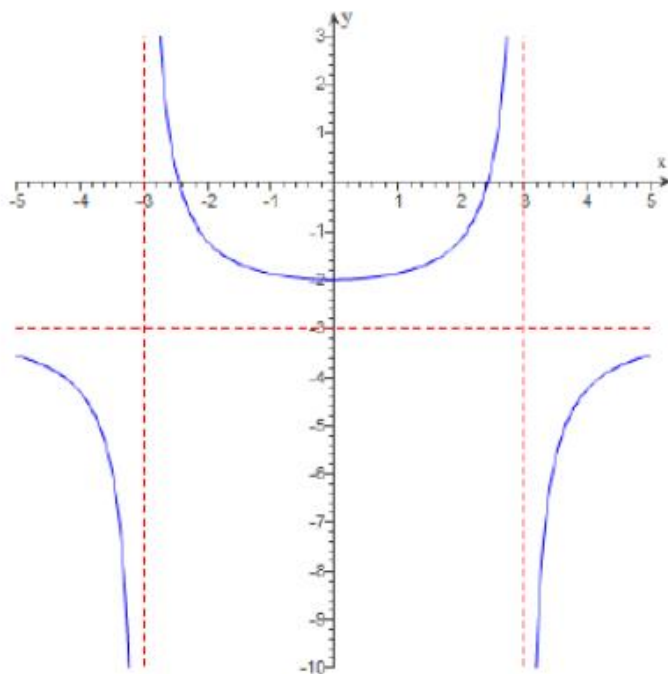


1. True or false: The graph of a rational function may intersect a horizontal asymptote.
2. True or false: The graph of a rational function may intersect a vertical asymptote.
3. What are the quotient and remainder when $4x^4 - x^2$ is divided by $x^3 - x^2 + 1$?
4. Graph the functions $y = -3 + \frac{1}{x}$ and $y = \frac{1}{(x+2)^2}$.
5. If a rational function is proper, then _____ is a horizontal asymptote.
6. If $\lim_{x \rightarrow \pm\infty} f(x) = L$ then the line $y = L$ is an _____ of the function $f(x)$.
7. Find the domain of the following rational functions:

(a) $\frac{8x(x-1)}{2x^2 - 5x - 3}$

(b) $\frac{14x^2 + x}{x^2 + 9}$

8. Find the vertical, horizontal and oblique asymptotes of the function $f(x) = \frac{x^3 - 27}{x^2 - 4x + 3}$.
9. Use the graph to find the following:



- (a) Find the domain and range of $f(x)$.
- (b) List all the intercepts.
- (c) List all of the vertical asymptotes of $f(x)$.
- (d) Find the horizontal or oblique asymptotes of $f(x)$, if any.

10. Consider the rational function $R(x) = \frac{(x^2 + 4x + 4)(2x - 2)}{x^3 - x}$

- (a) Find the domain of $R(x)$.
- (b) List all of the vertical asymptotes of $R(x)$.
- (c) Locate all of the holes in the graph, if any.
- (d) Find the horizontal or oblique asymptotes of $R(x)$, if any.

11.

12. Consider the polynomial $f(x) = x^4 - 2x^3 + 10x^2 - 18x + 9$.

(a) Determine the maximal number of real roots.

(b) USE RZT TO FIND THE ROOTS. OF THE EQUATION

(c) List all of the possible rational roots of $f(x)$.

(d) Find all of the roots of $f(x)$.

13. Find k so that $f(x) = x^3 + kx^2 + kx - 2$ has $x - 2$ as a factor.

14. Let $g(x) = x^3 + x^2 - x + 1$.

(a) How many positive and negative real roots can $g(x)$ have?

(b) Show that $g(x)$ has no rational roots.

(c)