

Section 2.6 Rational Functions and Asymptotes

Objective: In this lesson you learned how to determine the domains and find asymptotes of rational functions.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Rational function

Vertical asymptote

Horizontal asymptote

I. Introduction to Rational Functions (Pages 146–147)

The domain of a rational function of x includes all real numbers except . . .

To find the domain of a rational function of x , . . .

What you should learn

How to find the domains of rational functions

Example 1: Find the domain of the function $f(x) = \frac{1}{x^2 - 9}$.

II. Horizontal and Vertical Asymptotes (Pages 147–150)

The notation “ $f(x) \rightarrow 5$ as $x \rightarrow \infty$ ” means . . .

What you should learn

How to find horizontal and vertical asymptotes of graphs of rational functions

Let f be the rational function given by

$$f(x) = \frac{N(x)}{D(x)} = \frac{a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0}{b_m x^m + b_{m-1} x^{m-1} + \cdots + b_1 x + b_0}$$

where $N(x)$ and $D(x)$ have no common factors.

1) The graph of f has vertical asymptotes at _____

_____.

2) The graph of f has at most one horizontal asymptote determined by _____
_____.

a) If $n < m$, _____
_____.

b) If $n = m$, _____
_____.

c) If $n > m$, the graph of f has _____
_____.

Example 2: Find the asymptotes of the function

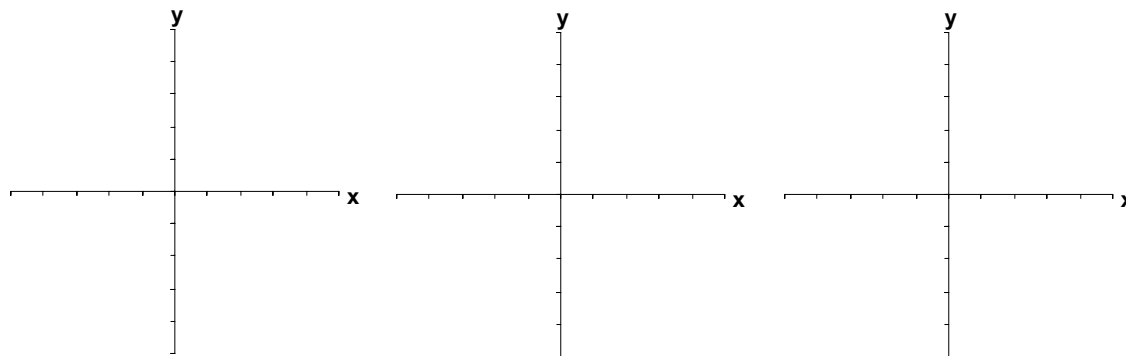
$$f(x) = \frac{2x - 1}{x^2 - x - 6}.$$

III. Applications of Rational Functions (Pages 150–151)

Give an example of asymptotic behavior that occurs in real life.

What you should learn

How to use rational functions to model and solve real-life problems



Homework Assignment

Page(s)

Exercises