

Section 3.5 Rational Functions and Asymptotes

Objective: In this lesson you learned how to determine the domain 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 (Page 271)

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 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 272–274)

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

Describe the end behavior of a rational function in relation to its horizontal asymptote.

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 _____
_____.

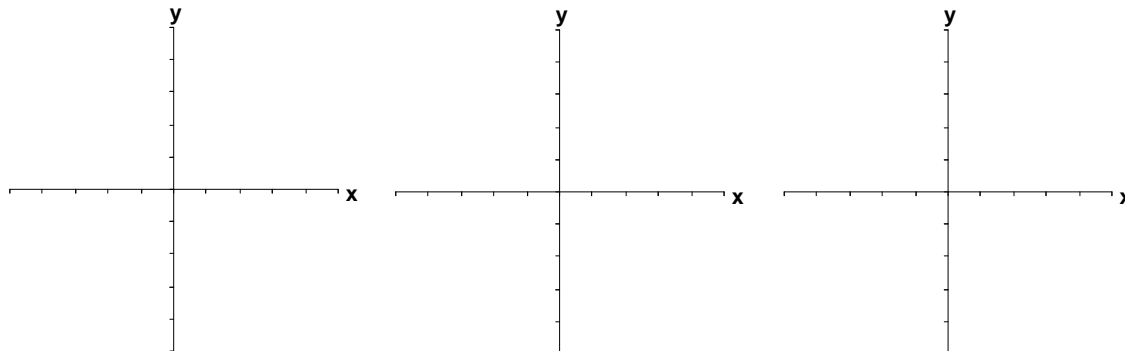
Example 2: Find the asymptotes of the function

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

III. Applications of Rational Functions (Pages 275–276)

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