Section 1.3  Graphs of Functions

Objective: In this lesson you learned how to analyze the graphs of functions.

Important Vocabulary: Define each term or concept.

Graph of a function
Greatest integer function
Step function
Even function
Odd function

I. The Graph of a Function  (Pages 30–31)

Explain the use of open or closed dots in the graphs of functions.

To find the domain of a function from its graph, . . .

To find the range of a function from its graph, . . .

The Vertical Line Test for functions states . . .
Example 1: Decide whether each graph represents \( y \) as a function of \( x \).

(a)  
(b)  

II. Increasing and Decreasing Functions  (Page 32)

A function \( f \) is increasing on an interval if, for any \( x_1 \) and \( x_2 \) in the interval, . . .

A function \( f \) is decreasing on an interval if, for any \( x_1 \) and \( x_2 \) in the interval, . . .

A function \( f \) is constant on an interval if, for any \( x_1 \) and \( x_2 \) in the interval, . . .

Given a graph of a function, to find an interval on which the function is increasing . . .

Given a graph of a function, to find an interval on which the function is decreasing . . .

Given a graph of a function, to find an interval on which the function is constant . . .

III. Relative Minimum and Maximum Values  (Pages 33–34)

A function value \( f(a) \) is called a relative minimum of \( f \) if . . .
A function value \( f(a) \) is called a **relative maximum** of \( f \) if . . .

The point at which a function changes from increasing to decreasing is a relative __________. The point at which a function changes from decreasing to increasing is a relative __________.

To approximate the relative minimum or maximum of a function using a graphing utility, . . .

**Example 2:** Suppose a function \( C \) represents the annual number of cases (in millions) of chicken pox reported for the year \( x \) in the United States from 1960 through 2000. Interpret the meaning of the function’s minimum at (1998, 3).

**IV. Graphing Step Functions and Piecewise-Defined Functions** (Page 35)

Describe the graph of the greatest integer function.

**Example 3:** Let \( f(x) = \left\lfloor x \right\rfloor \), the greatest integer function. Find \( f(3.74) \).

To sketch the graph of a piecewise-defined function, . . .
V. Even and Odd Functions (Pages 36–37)

A graph is symmetric with respect to the y-axis if, whenever \((x, y)\) is on the graph, \((-x, y)\) is also on the graph. A graph is symmetric with respect to the x-axis if, whenever \((x, y)\) is on the graph, \((x, -y)\) is also on the graph. A graph is symmetric with respect to the origin if, whenever \((x, y)\) is on the graph, \((-x, -y)\) is also on the graph.

A function whose graph is symmetric with respect to the y-axis is a(n) \(\underline{\text{even}}\) function. A function whose graph is symmetric with respect to the origin is a(n) \(\underline{\text{even}}\) function. The graph of a (nonzero) function cannot be symmetric with respect to the \(\underline{\text{odd}}\) function.

Additional notes

Homework Assignment

Page(s)

Exercises