Section 1.3 Shifting, Reflecting, and Stretching Graphs

Objective: In this lesson you learned how to identify and graph shifts, reflections, and nonrigid transformations of functions.

Important Vocabulary	Define each term or concept.	
Vertical shift		
Horizontal shift		
Rigid transformations		
Nonrigid transformations		

Sketch an example of each of the six most commonly used functions in algebra.

Constant Function

Identity Function

What you should learn How to recognize graphs of common functions



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II. Vertical and Horizontal Shifts (Pages 101–102)

Let *c* be a positive real number. Complete the following representations of shifts in the graph of y = f(x):

1) Vertical shift *c* units upward:

2) Vertical shift *c* units downward:

3) Horizontal shift *c* units to the right:

4) Horizontal shift *c* units to the left:

Example 1: Let f(x) = |x|. Write the equation for the function resulting from a vertical shift of 3 units downward and a horizontal shift of 2 units to the right of the graph of f(x).

III. Reflecting Graphs (Pages 103–104)

A **reflection** in the *x*-axis is a type of transformation of the graph of y = f(x) represented by h(x) = _____. A **reflection** in the *y*-axis is a type of transformation of the graph of y = f(x)represented by h(x) = _____.

Example 2: Let f(x) = |x|. Describe the graph of g(x) = -|x| in terms of f.

What you should learn How to use vertical and horizontal shifts to sketch the graphs of functions

What you should learn How to use reflections to sketch the graphs of functions

IV. Nonrigid Transformations (Page 105)

Name three types of rigid transformations:

- 1)
- 2)
- 3)

Rigid transformations change only the ______ of the graph in the *xy*-plane.

Name two types of nonrigid transformations:

- 1)
- 2)

A nonrigid transformation y = cf(x) of the graph of y = f(x) is

a ______ if *c* > 1 or a ______

if 0 < c < 1.

Additional notes



What you should learn How to use nonrigid transformations to sketch graphs of functions **Additional notes**



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