NAME _____ DATE _____

Study Guide

Student Edition
Pages 287–294

Functions

A special type of relation is called a **function.**

Definition of Function
A **function** is a relation in which each element of the domain is paired with *exactly* one element of the range.

Example 1: Is $\{(6, -3), (4, 1), (7, -2), (-3, 1)\}$ a function? Is the inverse a function?

Since each element of the domain is paired with exactly one element of the range, the relation *is* a function. The inverse is not a function because 1 is paired with more than one element of the range.

The equation $y = 2x + 1$ can be written as $f(x) = 2x + 1$. If $x = 3$, then $f(3) = 2(3) + 1$, or 7. Thus, $f(3)$, which is read "f of 3" is a way of referring to the value of y that corresponds to $x = 3$.

Example: If $f(x) = 3x - 4$, find $f(3)$ and $f(-2)$.

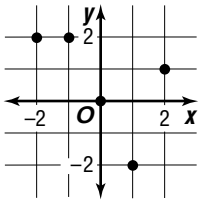
$f(3) = 3(3) - 4$ $\quad$ $f(-2) = 3(-2) - 4$

$= 9 - 4$ $\quad$ $= -6 - 4$

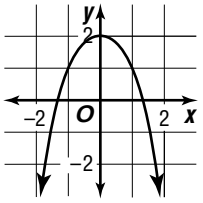
$= 5$ $\quad$ $= -10$

Determine whether each relation is a function.

1.



2.



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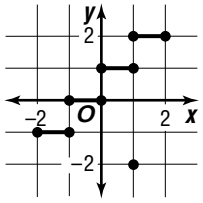

4. $\{(4, 2), (2, 3), (6, 1)\}$

5. $\{(-3, -3), (-3, 4), (-2, 4)\}$

6. $\{(-1, 0), (1, 0)\}$

7. $-2x + 4y = 0$

8. $x^2 + y^2 = 8$

9. $-\frac{1}{4}x = -\frac{1}{4}y - 2$

Given $f(x) = 2x - 4$ and $g(x) = x^2 - 4x$, find each value.

10. $f(4)$ **11.** $g(2)$ **12.** $f(-5)$ **13.** $g(-3)$ **14.** $f\left(\frac{1}{4}\right)$ **15.** $g\left(\frac{1}{4}\right)$