GUIDED NOTES – 3.1 FUNCTIONS AND FUNCTION NOTATION

LEARNING OBJECTIVES

In this section, you will:

- Determine whether a relation represents a function.
- Find the value of a function.
- Determine whether a function is one-to-one.
- Use the vertical line test to identify functions.
- Graph the functions listed in the library of functions.

DETERMINING WHETHER A RELATION REPRESENTS A FUNCTION

- A _____ is a set of ordered pairs. The first component of each ordered pair is called the _____ and the second component of each ordered pair is called the _____ .
- List what each value in the domain is known as: _____ or
_____ .
- List what each value in the range is known as: _____ or
_____ .

Study the box in your textbook section titled "function."

- State the definition of a function below.

* Remember the input values make up the domain, and the output values make up the range.

- Write out the 3-step process for determining whether the relationship is a function, given a relationship between two quantities.

    1.

    2.

    3.

Try It: Read Examples 1 and 2 in the text, then answer the following.

Table 2 lists the five greatest baseball players of all time in order of rank.

Player	Rank
Babe Ruth	1
Willie Mays	2
Ty Cobb	3
Walter Johnson	4
Hank Aaron	5

Table 2

a. Is the rank a function of the player name?

b. Is the player name a function of the rank?

Study the box in your textbook section titled "function notation."

- The notation $y = f(x)$ defines a function named f and is read as "y is a function of x". What do the letters x and y represent?

  - x:

  - y:

Try It: Read Examples 3 and 4 in the text, then answer the following.

Use function notation to express the weight of a pig in pounds as a function of its age in days d.

- Write out the 2-step process for determining whether the table represents a function, given a table of input and output values.

    1.

    2.

Try It: Read Example 5 in the text, then answer the following.

Does **Table 9** represent a function?

Input	Output
1	10
2	100
3	1000

Table 9

FINDING INPUT AND OUTPUT VALUES OF A FUNCTION

- Write out the 2-step process for evaluating, given the formula for a function.

    1.

    2.

Try It: Read Examples 6 and 7 in the text, then answer the following.

Given the function $g(m) = \sqrt{m-4}$. Evaluate $g(5)$.

Try It: Read Example 8 in the text, then answer the following.

Given the function $g(m) = \sqrt{m-4}$, solve $g(m) = 2$.

- Write out the 2-step process for writing a function's algebraic formula, given a function in equation form.

    1.

    2.

Try It: Read Examples 9 and 10 in the text, then answer the following.

If $x - 8y^3 = 0$, express y as a function of x.

- Write out the 4 step process for identifying specific output and input values, given a function represented by a table.

    1.

2.

3.

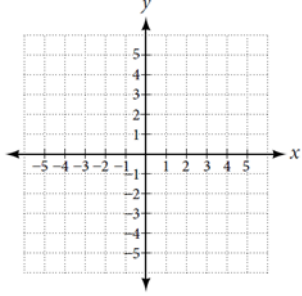
4.

Try It: Read Example 11 in the text, then answer the following.

Using **Table 11**, evaluate $g(1)$.

n	1	2	3	4	5
$g(n)$	8	6	7	6	8

Table 11

Try It: Read Example 12 in the text, then answer the following.

Using **Figure 6**, solve $f(x) = 1$.
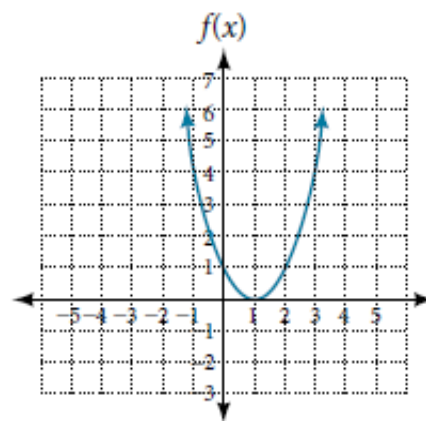
Figure 6

DETERMINING WHETHER A FUNCTION IS ONE-TO-ONE

Study the box in your textbook section titled "one-to-one function."

- Give the definition of a one-to-one function below.

Try It: Read Example 13 in the text, then answer the following.

    a. If each percent grade earned in a course translates to one letter grade, is the letter grade a function of the percent grade?

    b. If so, is the function one-to-one?

USING THE VERTICAL LINE TEST

- State below what the vertical line test is used for.

- Write out the 2 step process for using the vertical line test to determine if a graph represents a function, given a graph.

      1.

      2.

Try It: Read Example 14 in the text, then answer the following.

Does the graph in **Figure 13** represent a function? Explain.
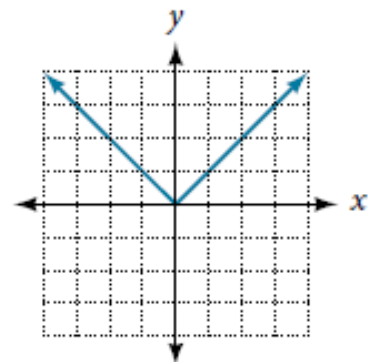
Figure 13

USING THE HORIZONTAL LINE TEST

- State below what the horizontal line test is used for.

- Write out the 2-step process for using the horizontal line test to determine if a graph represents a one-to-one function, given a graph of a function.

    1.

    2.

    Try It: Read Example 15 in the text, then answer the following.
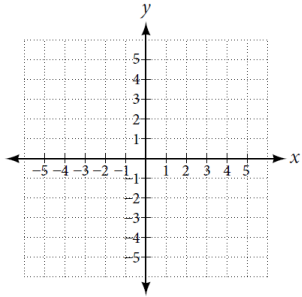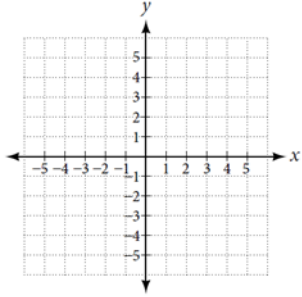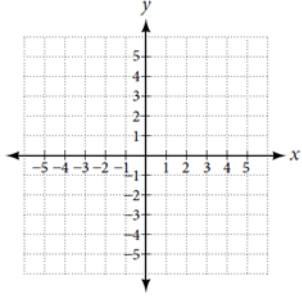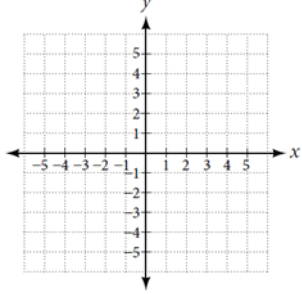
    Is the graph shown here one-to-one? Explain.
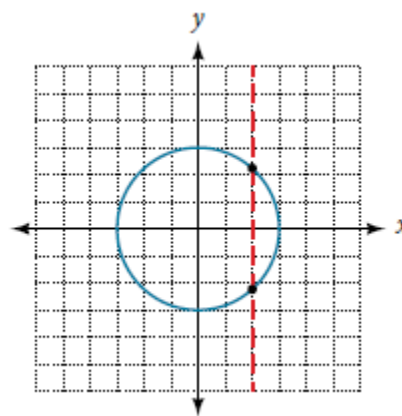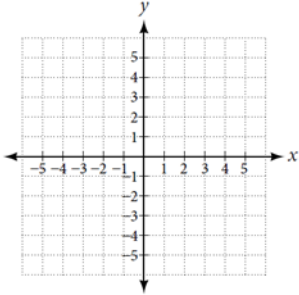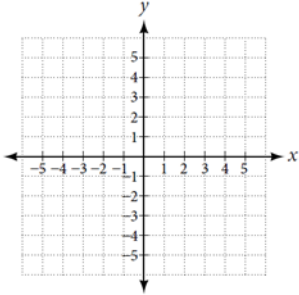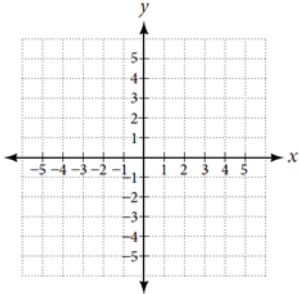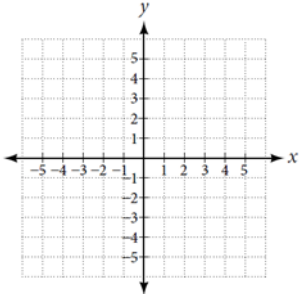
IDENTIFYING BASIC TOOLKIT FUNCTIONS

- Give the function and its graph for each function named in the table below.

TOOLKIT FUNCTIONS		
Name	**Function**	**Graph**

Constant			x	$f(x)$
Identity			x	$f(x)$
Absolute Value			x	$f(x)$
Quadratic			x	$f(x)$
Cubic			x	$f(x)$

Reciprocal			x	$f(x)$
Reciprocal Squared			x	$f(x)$
Square Root			x	$f(x)$
Cube Root			x	$f(x)$