

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? Explain.

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

Homework: You should now be ready to attempt problem 1 in “Homework – Section 3.1” on WeBWork.

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 . (Just set up the function notation, specifying the function and variable names.)

- 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 $g(m) = 2$. (NOTE that you are here given an output value.)

Homework: You should now be ready to attempt problems 14-15 in “Homework – Section 3.1” on WeBWork.

- 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 .

Homework: You should now be ready to attempt problems 2-4 in “Homework – Section 3.1” on WeBWork.

- 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 $f(x) = 1$.

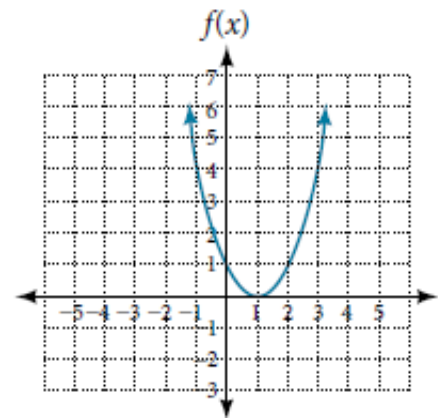


Figure 6

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.

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.

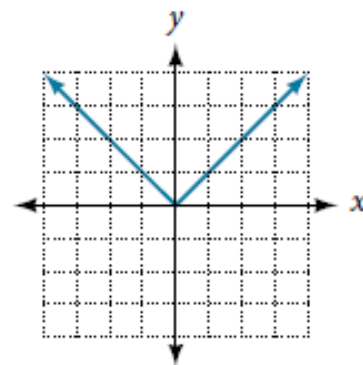


Figure 13

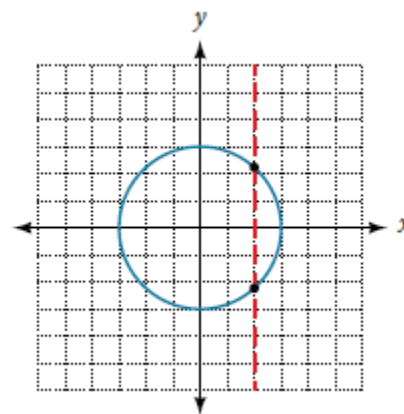
Homework: You should now be ready to attempt problems 6-7 in “Homework – Section 3.1” on WeBWork.

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.

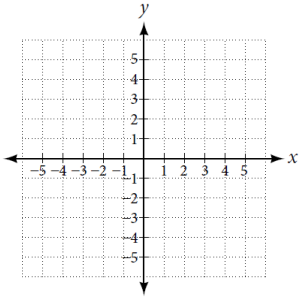
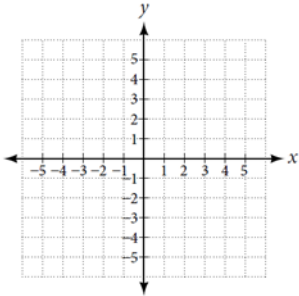
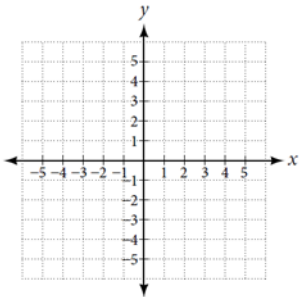
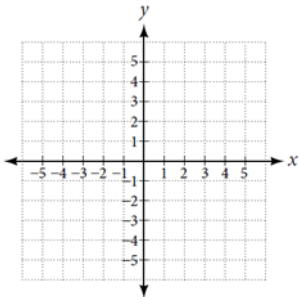
Is the graph shown here one-to-one? Explain.

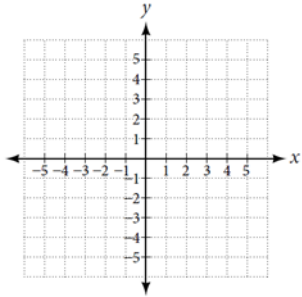
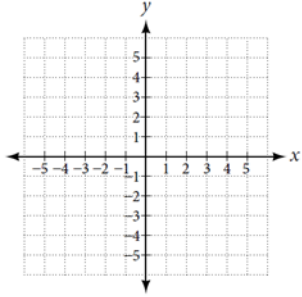
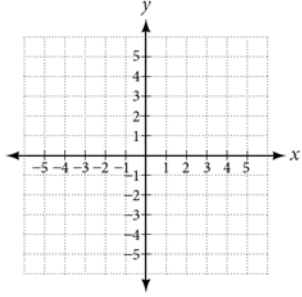
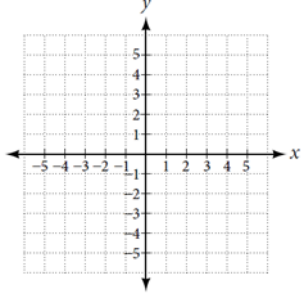
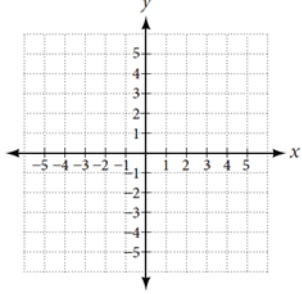


Homework: You should now be ready to attempt problem 8 in “Homework – Section 3.1” on WeBWork.

IDENTIFYING BASIC TOOLKIT FUNCTIONS

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

TOOLKIT FUNCTIONS														
Name	Function	Graph												
Constant		 <table border="1" data-bbox="1208 424 1498 634"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$										
x	$f(x)$													
Identity		 <table border="1" data-bbox="1208 728 1498 938"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$										
x	$f(x)$													
Absolute Value		 <table border="1" data-bbox="1208 1033 1498 1243"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$										
x	$f(x)$													
Quadratic		 <table border="1" data-bbox="1203 1337 1494 1619"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$										
x	$f(x)$													

Cubic			<table border="1" data-bbox="1205 147 1494 430"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$												
x	$f(x)$																
Reciprocal			<table border="1" data-bbox="1205 447 1494 735"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$												
x	$f(x)$																
Reciprocal Squared			<table border="1" data-bbox="1205 753 1494 1041"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$												
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Square Root			<table border="1" data-bbox="1205 1068 1494 1348"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$												
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Cube Root			<table border="1" data-bbox="1205 1371 1494 1650"> <thead> <tr> <th>x</th> <th>$f(x)$</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	x	$f(x)$												
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