MAT 1073 - MODULE 1 PRE-CLASS WORK myUTSA ID: _____

GUIDED NOTES – 1.1 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

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.*

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.

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 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

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 "Module 1 Homework" on WeBWorK.*

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.

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 $f(x) = 1$.

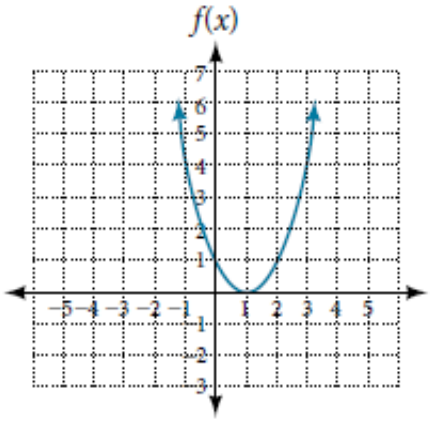


Figure 6

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

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

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

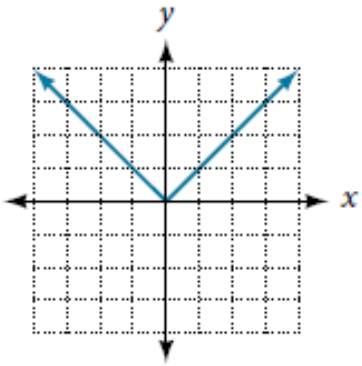


Figure 13

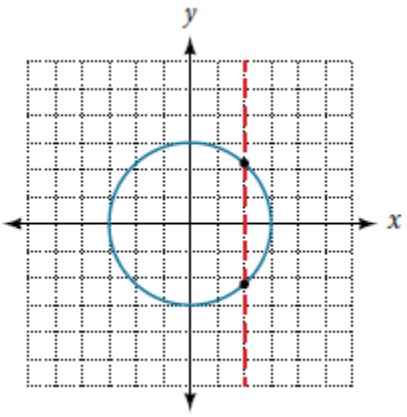
Homework: *You should now be ready to attempt problems 6-7 in "Module 1 Homework" on WeBWorK.*

USING THE HORIZONTAL LINE TEST

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

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 "Module 1 Homework" on WeBWorK.*

REVIEW QUESTIONS

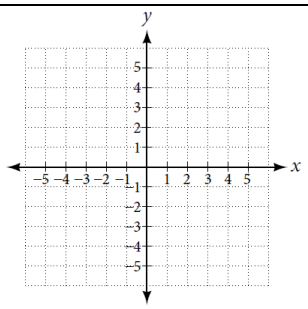
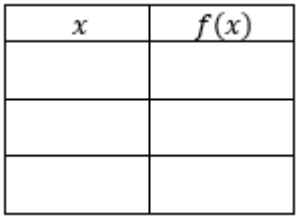
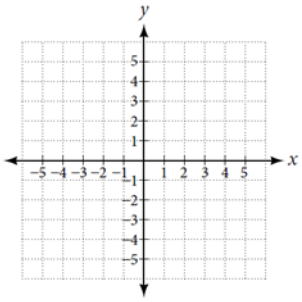
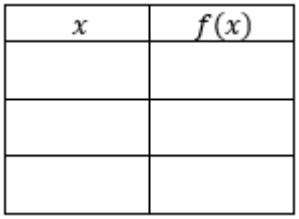
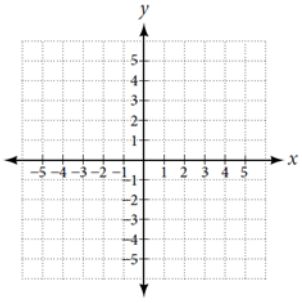
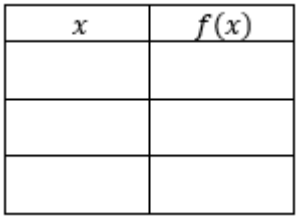
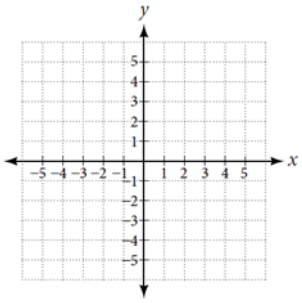
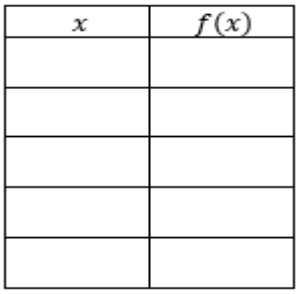
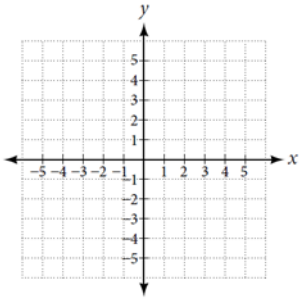
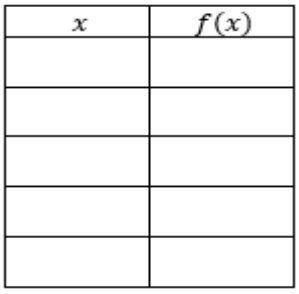
Answer the following questions in your own words.

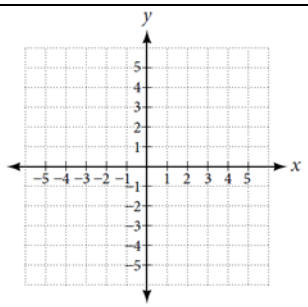
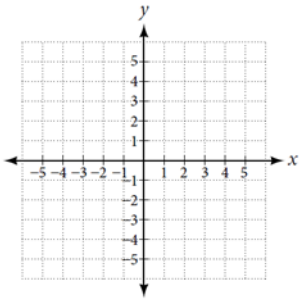
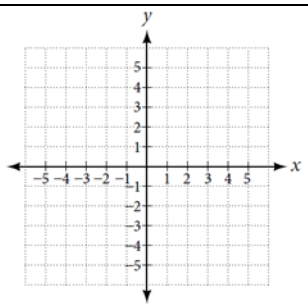
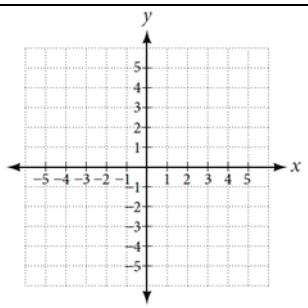
1. What is the difference between the input and the output of a function?

2. Why does the vertical line test tell us whether the graph of a relation is a function?

IDENTIFYING BASIC TOOLKIT FUNCTIONS

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

TOOLKIT FUNCTIONS		
Name	**Function**	**Graph**
Constant		 
Identity		 
Absolute Value		 
Quadratic		 
Cubic		 

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

GUIDED NOTES – 1.2 DOMAIN AND RANGE

LEARNING OBJECTIVES

In this section, you will:

- Find the domain of a function defined by an equation.
- Graph a piecewise-defined function.

FINDING THE DOMAIN OF A FUNCTION DEFINED BY AN EQUATION

- As a review, write the 4 conventions of interval notation as described in your textbook:
  -
  -
  -
  -

Try It: Read Example 1 in the text, then answer the following.

Find the domain of the function: $\{(-5,4),(0,0),(5,-4),(10,-8),(1,-12)\}$

Try It: Read Example 2 in the text, then answer the following.

Find the domain of the function: $f(x) = 5 - x + x^3$.

Try It: Read Example 3 in the text, then answer the following.

Find the domain of the function $f(x) = \frac{1+4x}{2x-1}$.

Try It: Read Example 4 in the text, then answer the following.

Find the domain of the function $f(x) = \sqrt{5+2x}$.

FINDING DOMAIN AND RANGE FROM GRAPHS

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

Given **Figure 12**, identify the domain and range using interval notation. *(Your answer will be approximate, based on a reading of the graph.)*

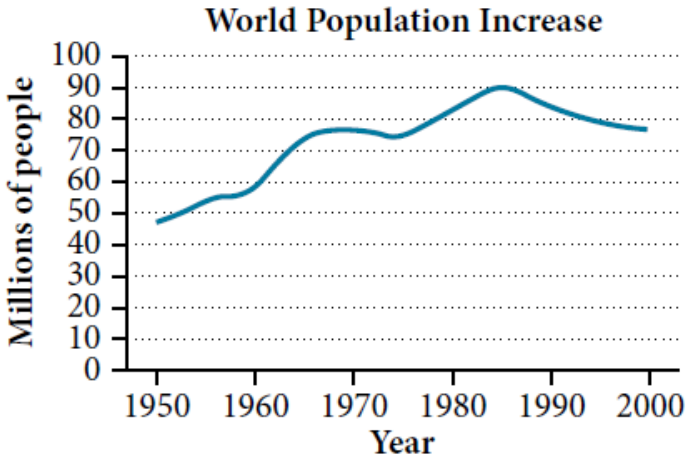


Figure 12

Homework: *You should now be ready to attempt problem 22-26 in "Module 1 Homework" on WeBWorK.*

REVIEW QUESTIONS

Answer the following questions in your own words.

3. Why does the domain differ for different functions?

4. Explain why the domain of $f(x) = \sqrt[3]{x}$ is different from the domain of $f(x) = \sqrt{x}$.

5. How do we determine the domain of a function defined by an equation?

FINDING DOMAINS AND RANGES OF THE TOOLKIT FUNCTIONS

Study the table in your textbook section under "Finding Domains and Ranges of the Toolkit Functions".

- Fill in the domains and ranges of the toolkit functions, using interval notation.

TOOLKIT FUNCTIONS		
Name	**Domain**	**Range**
Constant		
Identity		
Absolute Value		
Quadratic		
Cubic		
Reciprocal		
Reciprocal Squared		
Square Root		
Cube Root		