

Read the introduction on page 1. Be able to explain the difference between differential and integral calculus. Note that in MATH 135 we study differential calculus; in MATH 136 we study integral calculus.

This chapter is review from your precalculus course (MATH 119 or 121).

Definition of Function, page 2: Whenever a relationship exists between two variables such that for every value of the first, there is one and only one corresponding value of the second, we say that the second variable is a function of the first variable.

Functional Notation $y = f(x)$, page 3.

Rule of Four (top of page 3; also discussed in MATH 099 and 101)

Functions may be represented in four ways

- | | | |
|---|--------------------|--------------------------------------|
| 1 | Verbal Description | |
| 2 | Table of Values | (on TI-83 use 2 nd TABLE) |
| 3 | Graph | (on TI-83 use GRAPH) |
| 4 | Equation | (on TI-83 use Y=) |

Verbal Descriptions of Functions: An important skill to develop in this course is the ability to take a verbal description of a function and translate it into an equation. See Examples 10, 11, and 12, pages 11 and 12.

Domain (of a function): All the numbers that can be used as the first element in the ordered pair; the set of x 's. Page 9, middle.

Range (of a function): All the numbers that can be used as the second element in the ordered pair; the set of y 's. Page 9, middle

Analytic methods for finding the domain and the range

“Innocent until proven guilty”: All values of x are in the domain unless they are excluded. Reasons for possible exclusion include:

- Division by zero is undefined.
- Square root of a negative number is not a real number.
- Values do not make sense in the context of the problem

See examples 5 and 6 on pages 9-10 for finding the range. Calculus will give us additional techniques for identifying the range of a function. Example 10 on page 21 shows how a graph may be used to estimate the range of the function in Example 7, page 10.

Graphs of Functions

The “squeegee” analogy (from MATH 101).

Use a vertical squeegee to estimate the domain

Use a horizontal squeegee to estimate the range

Vertical Line test for functions: a relation is a function if no vertical line (squeegee) intersects the graph of the relation in more than one point.

Find domain and range for the functions and relations in Examples 1-8, pages 16-19

Example 1 Linear

Example 2 Quadratic

Example 3 Rational Note asymptotes

Example 4 Root

Example 5 Rational

Example 6 Piecewise defined, discontinuous

Observe open and closed circles on the graph in Figure 1-21

Example 7 Not a function. Show that this relation fails the vertical line test.

Using the TI-83 Graphing Calculator (or TI-82 or TI-84)

Y = menu for entering the function

WINDOW menu for setting Xmin, Xmax, Ymin, and Ymax

GRAPH to display a graph

TRACE to find specific points on the graph

2nd TblSet to set up a table

2nd TABLE to display a table

Equations Using a Graphing Calculator (page 20)

Solving for $y = 0$ (Enter function in Y1)

Using TRACE

Using 2nd Calc Zero (or Root)

Solving for $y = k$ (Enter function in Y1 and k for Y2)

Using TRACE

Using 2nd Calc Intersect

Assigned exercises: pages 12-13: 13, 17, 19, 21, 31, 35, 43
pages 21-22: 17, 19, 29, 31, 43, 53-56