Introduction and Functions

Math 131, Section 501

January 17, 2017

Introduction

Paul Gustafson

4th year PhD student

Topological phases of matter

Functional programming

Piano (favorite musician: marasy8)

Motivation for the course

Work ethic

Critical thinking skills

Attention to detail

Mathematical maturity

Signalling

Course information

Course webpage: http://math.tamu.edu/ pgustafs/math131

Office hours: 2:00-3:00 PM Mon, 11:00-12:30 AM Thurs

Exam dates: Feb 16, Mar 23, Apr 20, May 4

Lowest exam grade

Take-home quizzes (must turn them in yourself!)

Book and Webassign

Stewart Calculus 4.0

Hard copy or ebook

Must pay for webassign

- Hard copy purchase includes webassign
- Can just buy webassign/ebook
- 2 week free trial

Teaching Philosopy

Respect

I'm here to help you

No such thing as a stupid question

Functions

Definition

A **function** f is a rule that assigns to each element in a set D exactly one element, called $f(x)$ in a set E.

Ways to define a function

Words

A table

An algebraic rule

A graph

Applying functions

Let $f(x) = \dfrac{x^2+1}{x+3}$.

$f(1)$

$f(a)$

$f(2z-1)$

$f(g(x))$ where $g(x) = x^2 - 1$

Domain and range

Definition

The **domain** of f is the set of values x for which $f(x)$ is defined.

Definition

The **range** of f is the set of all possible values $f(x)$.

Finding domains

Rules:

- Cannot divide by 0
- Cannot take even roots of negative numbers
- Cannot take logarithms of numbers ≤ 0

Even and odd functions

Definition

A function f is **even** if the values $f(-x) = f(x)$ for all x.

The graph of an even function is symmetric about the y-axis.

Definition

A function f is **odd** if the values $f(-x) = -f(-x)$ for all x.

The graph of an odd function is symmetric about the origin.

Piecewise functions

Definition

A **piecewise function** is a function that has different rules for different parts of its domain.

Example

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

Increasing and decreasing functions

Definition

A function f is **increasing** if $f(x)$ increases as x increases.

Definition

A function f is **decreasing** if $f(x)$ increases as x increases.