# Review for Exam 1

Nick Egbert

MA 158

## Definition of a function

**You should be able to...**

- Determine when you are given a function (vertical line test)

- Given a function $f$, be able to find $f(\text{anything})$ and simplify

- Solve for $f(x) = 0$ or $f(x) = a$, where $a$ is a number other than 0.

## Domain and Range

**You should be able to...**

- Know when to use $(, [, ), ]$. (Brackets when point is included, parentheses when not)

- Know how to write an interval using the interval notation

- Given a graph, state the domain and range of the function

- Given a function like a polynomial, rational or square root function, state its domain

## Applications of functions

**You should be able to...**

- Determine the domain and range in the context of a word problem

- Convert a word problem into equations and then interpret the results in the context of the problem

- Set up a system of equations relating something like Surface Area and Volume, or Perimeter and Area

## Simplifying Algebraic Expressions

**You should be able to...**

- Given a complex fraction, simplify to a regular fraction

- Rationalize roots (multiplying by conjugate)

- Factor polynomial and rational expressions

## Operations on Functions/Compositions of Functions

**You should be able to...**

- Add, subtract, multiply and divide functions

- Find composition of functions given a table, graph or explicit equations

- Find domain of a composition of functions

## Applications of Compositions

**You should be able to...**

- Interpret a word problem and recognize when you are composing functions

- Determine domain in the context of a word problem

## The Difference Quotient

**You should be able to...**

- Given any function, find the average rate of change on an interval $[a, b]$.

- Find and simplify the difference quotient of the form $\frac{f(x+h)-f(x)}{h}$ or $\frac{f(x)-f(a)}{x-a}$

## Piecewise Functions

**You should be able to...**

- Graph a piecewise function

- Determine the domain and range of a piecewise function

- Determine $y$ values of given $x$ values of a piecewise function

- Interpret a piecewise-defined graph

- Apply these principles to word problems