Basic Calculus I

Class 1

Monday August 31

Re-viewing Functions

We will discuss one of the most important concepts in mathematics: the concept of **function**. We know you already have some idea what a function is, but we want to re-think the concept.

Exercise

Write down a sentence describing what a function is. If you have time, also write down an example of (a representation of) a function.

Different ways to view a function

There are a number of different ways to view, or represent a function. It is possible to think of the *same* function as:

a **formula**

a **graph**

a **table**

a **rule**

a **"machine"**

an **object**

It is important to be comfortable with the different ways we can view functions when we are considering functions in this course. If some of these ways make less sense than others, let us know!

Formal Definition

A **function** is a special type of relation that specifies how the value of one variable, called the *input* or *independent* variable determines **exactly one** value of a second variable, called the *output* or *dependent* variable.

The set of all possible *input* values is called the **domain**.

The set of all possible *output* values is called the **range**.

Functional Notation We often denote the independent (input) variable of a function by the letter x and the dependent (output) variable by the letter y.

Thus, one way to indicate the action of a function named f is to write $x \xrightarrow{f} y$ OR $x \xrightarrow{f} f(x)$
In equation form, this is usually written as $\boldsymbol{y = f(x)}$
(Because x and y are so often used as independent and dependent variables, students often think that no other letters can take their place. It's a big alphabet, and we'll be using all of it!)

Exercise
NOTE: The formal definition says *relation or rule* and not *formula*. Why make this distinction?

Examples of functions:

Which of the following graphs represent functions and why (or why not)?

ANNOUNCEMENTS

READ Section 1.1 and 1.2 of Hughes-Hallett (called HH from now on). You should finish this reading assignment before class on Wednesday September 2.

DO Problems 2, 4, 6, 8, 14, 16, 18, 20 on pages 5-7 of HH to hand in on **Wed Sep 2**

The Calculus Readiness Exam will be given *again* in Fowler 401 on Tue Sep 1 at 4:30pm. If you missed the exam or are unhappy with your Math Placement, you should take the exam.