

# “Get Real”

## **If I told you that...**

I have a chocolate bar, I plan to eat from it a little bit every day of my life, and I know that I will never run out.

What would you say?

## **And if I told you that...**

There are more points here  \_\_\_\_\_

than

people (who have ever lived and ever will live on earth)

and dogs (who have ever lived and ever will live on earth)

and ants (who have ever lived and ever will live on earth).

What would you say?

## **And if I told you that...**

There is now a place on earth where the temperature (in Fahrenheit) is exactly the same as your age in years, even if you calculate your age to be 13.096372252642785...

What would you say?



# Function ID Card

My name is \_\_\_\_\_

**What do I do?**

**What kind of objects do I take?**

**(What is a set I know what to do with, what is my domain?)**

**What kind of objects do I return?**

**(What is the co-domain?)**

**Do/Did I ever bring back the same object from the co-domain for two different objects from the domain?**

**What is the smallest set I can use as my co-domain and still ensure that I have all the objects I will ever need to return for this domain?**

**Today's class is brought to you by the letters f and R**

## **I Functions**

**Side, vertex counting**

**GCD** (Greatest Common Divisor: takes a pair of real numbers and returned the biggest number that divides them both).

**Identity**

**Euler Phi**

**Mod 3**

**What were the domains, co-domains used, what is the pre-image of 1?**

## **II Reals**

**Different kinds of numbers**

**The functions:**

**A**(ddition): Takes a pair of natural numbers and adds them: what is the domain, codomain?

**What if it takes a pair of integers; what is the domain, codomain?**

**S**(ubtraction): Takes a pair of natural numbers: what is the domain, codomain?

**What if it takes a pair of integers: what is the domain, codomain?**

**Multiplication:** Takes a pair of natural numbers: what is the domain, codomain?

**What if it takes a pair of integers: what is the domain, codomain?**

**D**ivision: Takes a pair of natural numbers (1, 2, 3, 4, 5,...): what is the domain, codomain?

**Rational/real**

**The squaring function: It will take an object and square it.**

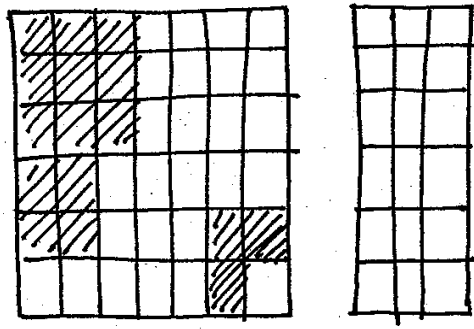
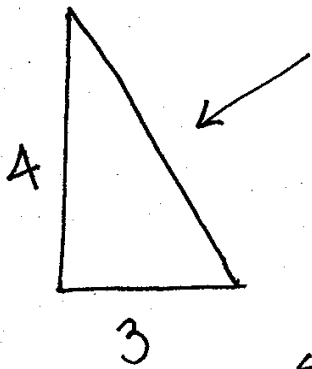
**My codomain is (1, 2, 3, 4, 5,...). What is the pre-image of 9, 4: what number(s), if I square it/them give 4,9?**

**Does the pre-image depend on the domain I choose?**

**Now, I want to make sure that every number in the co-domain will have something in its pre-image. Will the set of rational numbers be a correct choice for the domain?**

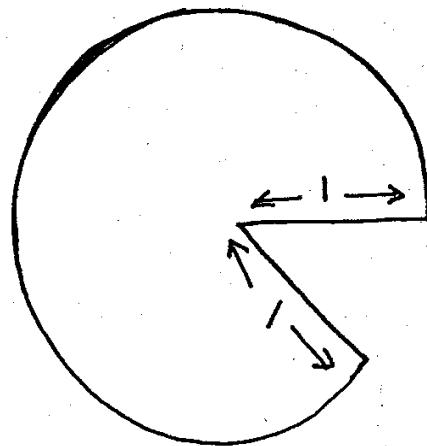
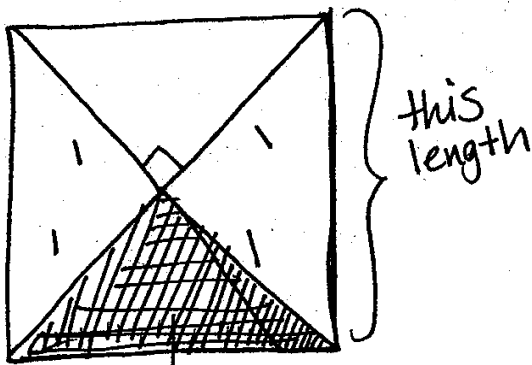
**Codomains: The distance function, birthyear of everyone in the room, temperature on planet earth**



**What kind of numbers do I need in order to describe the following:**



the # of days  
between my  
birthday  
and yours.

I promised Mina I'd  
give her a yoyo, but  
I don't have a yoyo.  
How many yoyo's do I  
have?



area of   
area of 

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \dots$$

**Today's class is brought to you by the letters G and P**

### **III Functions Involving the Reals**

**Can you fill out the Function ID Card for the functions you see on the page brought to you by G? Some are good to start with, some will challenge you further once you have understood the basics. (The functions on the page brought to you by P give an additional challenge.\*)**

**When you see an arrow between 2 functions, it means that they are connected or that I want you to apply one and then the other.**

**Try to graph these functions in the method described in class, ask someone how to graph, or use your previous knowledge of graphing.**

**Are there connections you see between the properties of the function described on the ID Card and the properties of the graph of the function?**

**\* Suggestions for P: Look for the pre-image of 1 for some of these functions;**

**You can graph them mentally, draw a graph in perspective, or use the darkness of the pencil under pressure to add another dimension to a plane drawing.**

This page is brought to you by the letter C

The function that takes a real # and asks it

N: "How far away are you from 0?"

D3: The function that takes a real # and asks

"How far away are you from 3?"

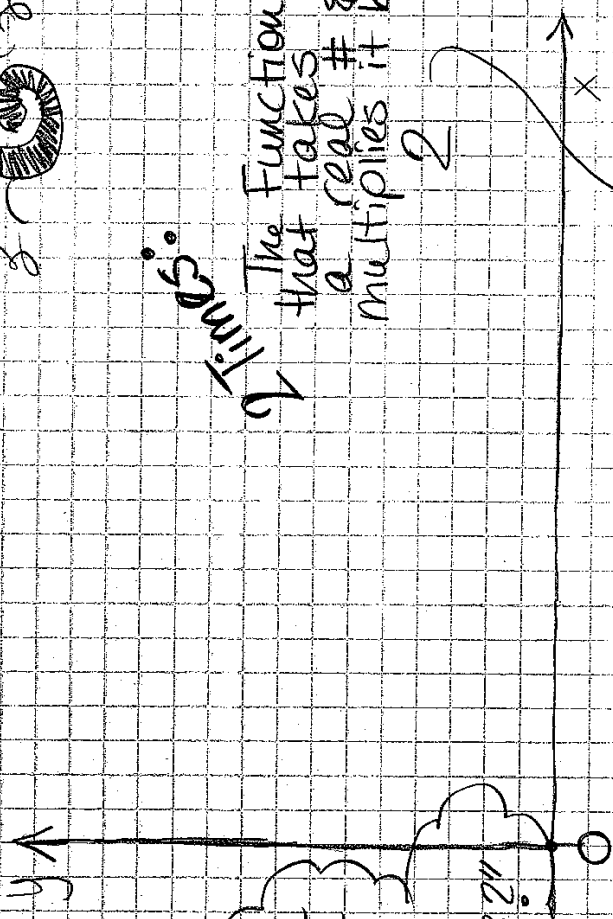
F: "The function that asks a real # 'How far away are you from 0?'"

F: "The function that asks a real # 'How far away are you from 0?'"

2 times:

The function that takes a real # & multiplies it by 2

The function that takes a real # & subtracts 5 from it







This page is brought to you by

R: that takes a point and asks "how far away are you from 0?"  
The function in this case is "how far away are you from 0?"

Tough pre-image of 1

A: The function that takes 2 real #'s and returns their sum

Mystery function

Takes a point on planet earth and asks "what is your temperature in Fahrenheit?"