Getting to know you Quiz (does not count towards the grade)

NAME: (print!) Quin Buob

E-MAIL ADDRESS: (print!) qwb1@rutgers.edu

Email to DrZlinear@gmail.com when I tell you to

Subject: pre0

with an attachment: pre0FirstLast.pdf

1.: What are your career goals?

The goal is to go to medical school and become a physician

2.: What are your hobbies?

I am a volunteer EMT and work as a lifeguard

3. What is a rational number?

A rational number is a real number of the form P/q where $q \neq 0$

4. Prove that the sum of two rational numbers is also a rational number,

Given $\frac{a}{b}$ and $\frac{c}{d}$ where a,b,c,d are integers and $b,d \neq 0$

Show $\frac{a}{b} + \frac{c}{d}$ is a rational number

$\frac{a}{b} + \frac{c}{d} = \frac{ad+cb}{bd}$, since both $ad+cb$ and bd are integers

$\Rightarrow \frac{ad+cb}{bd}$ is a fraction w/ integers $\Rightarrow$ its a rational number ☑

5. Prove or disprove (by giving a counterexample) : "the sum of two irrational numbers is always also an irrational number"

We know $\sqrt{2}$ is irrational, and we know the sum of a rational and irrational number is irrational

$\rightarrow 2+\sqrt{2}$ and $2-\sqrt{2}$ are both irrational

The sum of these 2 irrational numbers are equal to a rational number

$(2+\sqrt{2})+(2-\sqrt{2}) = 2+2+\sqrt{2}-\sqrt{2} = 4 \Rightarrow$ Therefor this statement is False

6. Prove that there are infintely many primes.

Ran out of Time

7. Prove that $\sqrt{5}$ is an irrational number.

Assume $\frac{p}{q} = \sqrt{5}$ + p and q have no common factor

$\Rightarrow \frac{p^2}{q^2} = 5$

$\Rightarrow p^2 = 5q^2$

This means that 5 divides $p^2 \Rightarrow$ 5 divides p.

So we have $p = 5r$ where r is an integer

This argument extends to q

P and q have a common factor 5 which is a contradiction

$\therefore \sqrt{5}$ is irrational