MAT246 Pre-Course Evaluation by Parker Glynn-Adey
THIS WILL NOT BE MARKED, BUT IT IS VERY IMPORTANT.

This course is an introduction to mathematics and proofs. To get a sense of what you know about math, I have prepared the following small evaluation. Take your time, and answer honestly.

1) What is mathematics?

2) What are proofs?

3) Who makes new mathematics? Who uses mathematics?

4) Why are you taking this course? What do you want to learn?

5) Do you have a favourite theorem? Can you prove it?

A) Circle any notation you do not understand.

$\{x \in \mathbb{R} : x^2 > 1\}$ $\quad$ $A \cap B = C$ $\quad$ $\sum_{k=1}^{\infty} \frac{1}{k^2} = \frac{\pi^2}{6}$ $\quad$ $\forall_{\epsilon>0} \exists_{\delta>0} |x-c| < \delta \Rightarrow |f(x)-L| < \epsilon$

B) Try to prove each of the following.

1. $(-x)(-y) = xy$.
2. If ABC is a right angled triangle with hypotenuse C then $A^2 + B^2 = C^2$
3. For any natural n and $x \neq 1$ we have $1 + x + x^2 + \cdots + x^{n-1} = \frac{1-x^n}{1-x}$.
4. Suppose six people meet and shake hands randomly. Show that either three people all shake hands with each other or three people do not shake hands with each other. Does this hold with five people?