# MAE 501 HOMEWORK–5 DUE AT THE BEGINNING OF CLASS ON THURSDAY, OCTOBER 6

One goal for this course is for you to develop your skill in effectively communicating mathematics. With this in mind, you should clearly write up your solutions.

(1) On the Regents exam you were asked to prove that, when two parallel lines are cut by a transversal, the alternate interior angles are congruent. Give a proof of this theorem. Prove any lemmas you use along the way.

(2) In class we used the identity $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$.
In her notes, Jenna suggested a proof of this identity. Either write up a detailed version of Jenna's proof, filling in missing steps and a written explanation, or write up your own proof of this identity.

(3) In class we discussed the definition of limit for advanced calculus students and for high school algebra students.

 (a) Write our formal definition of a the limit: $\lim_{x\to\infty} f(x) = L$. Write a verbal (and less formal) "translation" of the formal definition.

 (b) As clearly and precisely as possible, explain any problems with this proposed definition:
$$\lim_{x\to\infty} f(x) = L$$
 if for every $\delta > 0$, there exist some $\epsilon > 0$ such that $x > \delta$ implies that $|f(x) - L| < \epsilon$.

(4) More to be posted by 5pm on Friday.