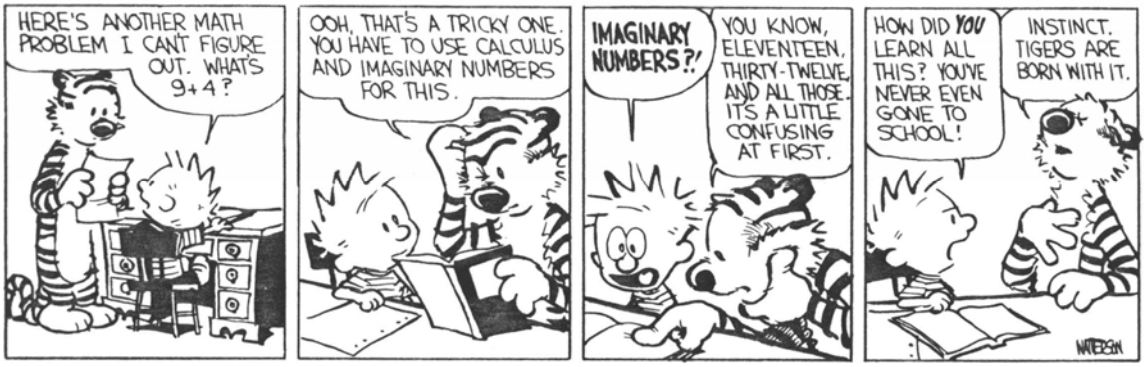
MTE 483 Oehrtman
Spring 2008

Homework 1
Due January 22, 2008



1. You are given two intersecting straight lines and a point *P* marked on one of them. Show how to construct, using a straightedge and compass, a circle that is tangent to both lines and that has the point *P* as its point of tangency to one of the lines.

2. Determine a simple formula for the series $\sum_{k=1}^{n} \frac{k}{(k+1)!}$.

3. Let $P(x)$ and $Q(x)$ be polynomials whose coefficients are the same but in "backwards order":

$$P(x) = a_0 + a_1 x + a_2 x^2 + \cdots + a_n x^n$$
$$Q(x) = a_n + a_{n-1} x + a_{n-2} x^2 + \cdots + a_0 x^n$$

   What is the relationship between the roots of $P(x)$ and $Q(x)$? Prove your answer.

4. Consider the parallelogram *ABCD* with diagonals *AC* and *BD*. State all the properties of the figure that you are willing to accept. Then give a complete argument justifying why you believe your assertions to be correct.