**Math 35**
**Winter 2014**
**Homework Assigned Friday, January 17**

As usual, this homework is due at the beginning of class next Wednesday, January 22.

**Problem:** Prove that, for every $x > 0$ and every $\varepsilon > 0$, there is an $h > 0$ such that $(x + h)^3 - x^3 < \varepsilon$.

You may use any facts about the arithmetic of $\mathbb{R}$ (that is, any facts about $+$, $\cdot$, $<$, of the kind we proved in sections 1.1. and 1.2) that you wish, without referring back to an axiom, proposition, homework or in-class exercise. In particular, you may use the fact that sums, products, and quotients of positive numbers are positive.

You can find examples of proofs like this in the text and on the web page. Use those examples for inspiration if you like. Write this proof out very clearly in your own words. Since this is the only problem assigned today, you should have time to do it well.

We will be doing arguments like this (given $\varepsilon > 0$, find $h > 0$ small enough to guarantee some quantity is less than $\varepsilon$) all term, so you should start becoming comfortable with them.