

Math 407, Assignment 2, Fall 2006

due Tuesday, October 31

Everybody knows that exponentials beat powers, but understanding why this is true is difficult. In this assignment you are asked to give a mathematical proof of this fact and also to think about what insights from the proof would be accessible to high school students.

1. Prove the following statement: for every $a > 1$ and $n > 0$, there exists a number L such that

$$a^x > x^n \quad \text{for } x > L.$$

2. How much of the argument in (1) could you give to high school students? Would you need to modify or amplify pieces of it to do this? Give a detailed answer with specifics of how you would present things.
3. What sorts of activities could you give to students in order to support their ability to appreciate the proof you gave in (1), or at least to appreciate some piece of it? Again, give a detailed answer with specifics.