

Mathematics 446 — fourth assignment — due Monday, October 20

Exercise 1. Prove by mathematical induction this formula for the n -th Fibonacci number:

$$F_n = \frac{\Phi^n - (-1)^n / \Phi^n}{\sqrt{5}}$$

where $\Phi = 1.618\dots$ is the golden ratio. Then use it to prove that the ratio of F_{n+1}/F_n converges to Φ by answering this question explicitly: given a small number ε , how large does n have to be in order that

$$|F_{n+1}/F_n - \Phi| \leq \varepsilon ?$$

Exercise 2. Read Euclid X.1, X.2, VI.1, VI.2, VI.4. Rewrite Euclid's statements and proofs of these in your own words. **Be clear and succinct.** For VI.1, you need only do the case of triangles—i.e. what is needed for the others. As for the references to Book V, state what is needed as clearly as you can.