115 Homework 1

Due Friday October 8

Question 1 Prove that $\sqrt{5}$ is irrational.

Question 2 (Rosen 1.2.8) Use mathematical induction to show

$$1^3 + 2^3 + 3^3 + \cdots n^3 = \frac{n^2(n+1)^2}{4}.$$

Question 3 (Rosen 1.3.4) Derive a simple formula for sums of even index Fibonacci numbers

$$f_2 + f_4 + \cdots + f_{2n}.$$

Question 4 (Rosen 1.4.22) Show that

$$[x] + [x + \frac{1}{2}] = [2x]$$

for any real number x.