

Introduction to Abstract Mathematics Spring 2017

Assignment 6.2
Due February 27

Exercise 1. In this exercise we'll provide a different proof of our favorite fact, that $\sqrt{2}$ is irrational.
a. Assume $\sqrt{2}$ is rational, and let $p, q \in \mathbb{N}$ with $p / q=\sqrt{2}$. Show that $0<p-q<q$.
b. With $p, q$ as above, show that

$$
\frac{2 q-p}{p-q}=\sqrt{2}
$$

c. Use the Well-Ordering Principle and parts $\mathbf{a}$ and $\mathbf{b}$ to arrive at a contradiction.

