Math 2200 Homework 2

Due Date: September 4

Please write the statements to be proved precisely, labeling them “theorem”, “proposition”, “result”, or “fact” (you decide how important each one is!). Write proofs using complete sentences, using words like “and”, “or”, and “if... then” instead of logical symbols. Write neatly, be precise, and don’t include extraneous information! You can find models of proofs in Section 1.7 and in your notes. Remember that you have three main types of proofs at your disposal: direct, contrapositive, and contradiction.

Get started early: this is a long assignment, and some of the proofs are tricky! I will give hints and proof-writing help in office hours. Good luck!

Section 1.6 (p. 79)

# 11 (you may use logical symbols here)

Section 1.7 (p. 91)

# 1, # 5, # 7, # 9, # 11, # 15, # 25, # 30, # 38.

Additional Problem

Prove the lemma:

Lemma 1. If $n$ is an integer and $n^3$ is even, then $n$ is even.

Use this to prove:

Theorem 1. $\sqrt{2}$ is irrational.