MATH 381: Assignment 1 (due: January 24, 2020)

1. Prove that $\sqrt{2} + \sqrt{3}$ is an irrational number.

2. If (a, b, c) is a primitive Pythagorean triple so that $a^2 + b^2 = c^2$, show that c cannot be even.

3. Show that the diagonals of a regular pentagon trisect the angle at each vertex.

4. Given any pentagon, show that one can construct a square using straightedge and compass, such that the area of the square is equal to the area of the given pentagon.

5. Write a short essay (minimum 1 page; maximum 2 pages, typed in 12 point font, double spaced) discussing the role of mysticism in the development of mathematics, especially with reference to the Pythagorean school.