Assignment 1 – Part 1 – Math 412

Textbook exercises:[1]

Section 1.1: 6 (WI), 8 (WI)

Other exercises:

(1) Sums of three squares. In class, we showed that if n has remainder 3 when divided by 4, then n cannot be written as a sum of two squares. This question gives a similar result for sums of three squares.

(a) Show that when divided by 8, the square of any integer has remainder either $0, 1$, or 4.

(b) Conclude that if n has remainder 7 when divided by 8, then n cannot be written as a sum of three squares.

(c) Give an example of a number of the form $4k + 3$, $k \in \mathbf{Z}$, that *is* a sum of three squares.

[1] From Hungerford's *Abstract algebra, An introduction, Third edition*