

Comp 2700 (Discrete Structures) Fall 2019. Homework 2.

Submissions: This assignment is due in class on Th Sep 26th 2019. Each student must submit his or her own assignment. Solutions can either be typed in Latex, MSWord or other such word processing software, or printed clearly. You must write your name and UUID clearly on your submitted assignment.

Academic Integrity: You are encouraged to work in groups, but everyone must write out their own solutions. Absolutely no word to word copying is allowed. Please refer to the course policies and schedules about this. If you have worked with other students on the assignment or referred to external sources, please mention all names and sources on your assignment.

Partial solutions: If you are sure that you know how to arrive at a solution, but you get stuck in some place, it is better to write the partial solution. Honest attempts at partial solutions will be awarded.

Name:	
UID:	
Email:	

Problem 1 [10 + 15 = 25 pts]: Show that $\sqrt{6}$ is irrational. Show that $\sqrt{2} + \sqrt{3}$ is irrational.

Problem 2 [25 pts]: In class we have defined the gcd of two integers. We can extend to more integers. Define the gcd of three integers a, b, c as the largest common divisor of a, b, c , and denote it by (a, b, c) . Show that $(a, b, c) = ((a, b), c)$ and that (a, b, c) can be expressed as a linear combination of a, b, c .

Problem 3 [20 pts]: Show the AM-GM inequality for two variables: If $x, y \geq 0$ are real numbers show that,

$$\frac{x + y}{2} \geq \sqrt{xy}.$$

Problem 4 [20 pts]: Show that $n^2 + 4 < 2^n$ for all $n \geq 5$.

Problem 5 [10 pts]: Show that there are 1000 consecutive integers none of which is a cube of any integer.