CECS 228 Name:  
LAB #2.2 ID: Date:

Objectives:

* Be able to apply different methods of proof and strategy

Exercise 1:

a. Show that the product of two of the numbers 651000 −82001 + 3177,

791212 − 92399 + 22001, and 244493 −58192 + 71777 is nonnegative. Is your proof constructive or nonconstructive? [Hint: Do not try to evaluate these numbers!]

b. Prove that there exists a pair of consecutive integers such that one of these integers is a perfect square and the other is a perfect cube. Is your proof constructive or nonconstructive?

Exercise 2: Prove that *n*2 + 1 ≥ 2nwhen *n* is a positive integer with 1 ≤ *n* ≤ 4.

(Proof by cases)

Exercise 3: Prove or disprove that if a and b are rational numbers, then ab is also rational.

Exercise 4: Prove that there are no solutions in integers x and y to the equations 2x2 + 5y2 = 14

Exercise 5:  
The **quadratic mean** of two real numbers *x* and *y* equals . By computing the arithmetic and quadratic means of different pairs of positive real numbers, formulate a conjecture about their relative sizes and prove your conjecture.