CECS 228 Name:  
LAB #2.1 ID: Date:

Objectives:

* Be able to apply Direct Proof
* Be able to apply Proof by contradiction
* Be able to apply Proof by contrapositive

Exercise 1: Use direct proof to prove the following:  
a If n is an odd integer, then n2 is an odd integer.

(Note: the definition of an odd integer is an integer that can be expressed as 2k + 1, where k is an integer.)

b. The product of two odd integers is an odd integer.

c. If r and s are rational numbers, then the product of r and s is a rational number.

Exercise 2: Use proof by contrapositive to prove the following:  
a. For every integer n, if n2 is an odd, then n is odd.

b. If x and y are real numbers and x + y is irrational, then x is irrational or y is irrational.

c. If x and y are positive real numbers and xy > 400, then x > 20 or y > 20.

Exercise 3: Use proof by contradiction to prove the following:  
a. If a group of 9 kids have won a total of 100 trophies, then at least one of the 9 kids has won at least 12 trophies.

b. is irrational. You can use the following fact in your proof: “If n is an integer and n3 is even, then n is even.”

c. There is no smallest integer.