Exam 1: CSE 173, SEC- 7, Fall 2020, Time: 50 minutes

Question 1

A) What do you understand by the term validity of an argument? Prove that the Hypothetical syllogism

rule is a valid argument.

B) People in our locality use masks or do social-distancing properly to stop COVID-19. Everyone is either not doing social distancing properly or going random shopping. A person does not go random shopping whenever he/she is aware of COVID-19. Also, some people are not using masks. Therefore, some people are not aware of COVID-19.

Now, answer the followings:

(a) Translate the above argument into logic form: identify the premises and conclusion.

(b) Use rules of inference to show that the argument is valid; that is, some people are not aware of

COVID-19.

Question 2

Apply mathematical induction and prove that 3 + 3 ∗ 5 + 3 ∗ 5

2 + ... + 3 ∗ 5

n = 3(5n+1 − 1)/4 whenever n is

a nonnegative integer.

Question 3

Show if the logical expression [(x ∨ y) ∧ (x → z) ∧ (y → z)] → z is a tautology/contradiction/contingency.

Question 4

(a) Assume two sets A, B of your choice with cardinality at least 3. Calculate A × B, and write the total

number of elements in the power set of A × B. Comment whether A × B = B × A could be true or

not.

(b) Given g : P → Q and f : Q → R, if f, g both are onto function, then the composite function f o g is

onto function. Prove, or disprove.