

# Sample Solution

**Section: 153**

Name & Surname: \_\_\_\_\_

Math 120 Spring 2019-2020

Quiz no.: 01

ID Number: \_\_\_\_\_

Date: 21.02.20

Time Limit: ~10 Minutes

Grade: \_\_\_\_\_

**Declaration of Honesty:** By signing below, I pledge that I will write this examination as my own work and without the assistance of others or the usage of unauthorized material or information. I understand that possession of any kind of electronic device during the exam is prohibited. I also understand that not obeying the rules of the examination will result in immediate cancellation and disciplinary procedures.

Signature : .....

1. Find the sum of the series  $\sum_{k=1}^{\infty} \left(-\frac{119}{120}\right)^k$ .

$$\sum_{k=1}^{\infty} \left(-\frac{119}{120}\right)^k = \sum_{k=0}^{\infty} \left(-\frac{119}{120}\right)^{k+1} = \left(-\frac{119}{120}\right) \sum_{k=0}^{\infty} \left(-\frac{119}{120}\right)^k$$

$$= \frac{-119}{120} \cdot \frac{1}{1 - \left(-\frac{119}{120}\right)} = \frac{-119}{239}$$

$|r| = \left|-\frac{119}{120}\right| < 1$   
So, geometric series is convergent

OR

$$\sum_{k=1}^{\infty} \left(-\frac{119}{120}\right)^k = -1 + 1 + \sum_{k=1}^{\infty} \left(-\frac{119}{120}\right)^k = -1 + \sum_{k=0}^{\infty} \left(-\frac{119}{120}\right)^k$$

$$= -1 + \frac{1}{1 - \left(-\frac{119}{120}\right)} = \frac{-119}{239}$$

$|r| = \left|-\frac{119}{120}\right| < 1$   
So, geometric series is convergent.