**Department of Mathematics**

**College of Sciences**

**King Saud University**

**Math 382**

**Second Midterm Exam**

**Second Semester, 1435-1434H**

**Time: 90 min.**

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| **Name:** |
| **Student No.** |

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| **Question number** | I  | II | III | IV | Total |
| **Mark** |  |  |  |  |  |

 In the following questions ,  are sequences of real numbers,  are functions and c is a cluster point of A.

# Question I

1. Prove that if ,  are Cauchy sequences then so is .
2. Let ,  be sequences of positive numbers such that  and  is bounded. Prove that 

# Question II

Find the limit if it exists:

1. 
2. 

1. 
2. 

**Question III**

1. State and prove the sequential criterion of the limit of a function.
2. If and  exist, then 

**Question IV**

Prove or disprove the following:

1.  is Cauchy.
2. .
3. If  and then .

(d) If exists, then at least one of  and  exists.