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| **College of Sciences** |
| **Department of Mathematics** |
| **373 Math** |
| **Second Midterm** |
| **Second semester 1433-1434** |

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**Question1:**

1. Let be a function from a space into a space . Prove that is continuous if and only if for every , .
2. Let be nonempty subset of a topological space . Prove that is open in if and only if .
3. Prove that density is a topological property.

**Question 2:**

1. Let be topological spaces, and let and . Prove that .
2. Let,… be topological spaces. Prove that the projection function is open function.

**Question 3:**

1. Prove that every finite subset of a Hausdorff space is closed.
2. Prove that with the topology is compact, but with usual topology is not compact.
3. If is a compact topological space and is infinite subset of , then has at least one limit point in .