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| KSU logo tiff.tif | **King Saud University** |
| **College of Sciences** |
| **Department of Mathematics** |
| **373 Math** |
| **Second Midterm** |
| **First semester 1433-1434** |

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**Question 1:**

1. Give a definition of a base for a topological space.
2. Prove that is a base for with usual topology.

**Question 2:** Let be topological spaces, and let . Prove that is a base for a topology on the set . What is call the topology generated by .

**Question 3:** Prove that the function , , defined by is a metric on , where and .

**Question 4:**

1. Prove that if is metric space and is open ball center at with radius and , then there is such that .
2. What does we mean by the metrizability problem? Is every topological space metrizable?

**Question 5:** Prove that any infinite set with Co-finite topology is not Hausdorff.

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