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| King Saud University  |  | 373 Math |
| College of Sciences | Second Midterm Exam |
| Department of Mathematics | Frist Semester 1437-1438 |

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| **Name:** |  |
| **Id #:** |  |

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| Question  | Marks |
| Q1(a) |  |
| Q1(b) |  |
| Q1(c) |  |
| Q1(d) |  |
| Q1(e) |  |
| Q2(a) |  |
| Q2(b) |  |
| Q2(c) |  |
| Q3(a) |  |
| Q3(b) |  |
| Q3(c) |  |
| Total out of 40 |  |
| Total out of 20 |  |

Question 1: (5x3=15 marks)

Prove or disprove the following:

1. is homeomorphic to .
2. If satisfies that for each , then is continuous.
3. If are two topological spaces with

Then EXT(AxB)=EXT(A)xEXT(B).

1. is Hausdorff space.
2. Every subset of compact topological space is compact.

Question 2: (2+5+5=12 marks)

1. Define what do you mean by a topological property.
2. Show that being a Hausdorff space is a topological property.
3. If  is a continuous bijection from a compact space *X* to a Hausdorff space *Y* prove that *f* is a homeomorphism.

Question 3: (5+2+6=13 marks)

1. Prove that if *A* and *B* are compact subspaces of a Hausdorff space then  is compact.
2. Is  also compact? Justify?
3. Prove that if is a continuous function between a compact space X and the usual topology on , then assumes its maximum and minimum.

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