Home Assignment 5

Discrete Mathematics – CSC/MAT A67, Winter 2024

1. Prove or disprove the following statements:

   a. There exist sets S and T such that $|(S \times T) \setminus (T \times T)| = |T|$.

   The statement is true. For example, S = {1,2} and T = {1}, in which case we have S × T = { (1,1),(2,1)) } and T × T = (1,1). Hence, (S × T) \ (T × T) = { (2,1) }, which is a set of size 1 = |T|.

   b. For all sets S and T it holds that $|(S \times T) \setminus (T \times T)| = |T|$.

   This is not true. For example, S = {1} and T = {1,2}, in which case S × T = { (1,1),(1,2) } and T × T = { (1,1),(1,2),(2,1),(2,2) }, and we have that (S × T) \ (T × T) = ø.