CSCI 1900 - Homework 15 - B

**Section 2.3: Functions**  *(26)*

Given *A* = { *a*, *b*, *c*, *d*, *e* } and *B* = { 1, 2, 3, 4 }

1. Determine if the following relations *R* from *A* to *B* are functions. **(4)**
   1. *R* = { (*a*,1), (*b*,2), (*c*,3), (*d*,4) }
   2. *R* = { (*a*,1), (*b*,2), (*a*,3), (*d*,4) }
   3. *R* = { (*a*,1), (*b*,1), (*c*,3), (*d*,3) }
   4. R = { (*a*,1), (*b*,1), (*c*,1), (*d*,1), (*e*,1) }
2. Why is the relation *Q* from *C* to *D* a function or not. **(1)**  
   *C* = the set of all freshman students at ETSU  
   *D* = the set of student ID number of the form Ennnnnnnn where n are from the set {0…9}  
   *c Q d* if *d* is *c*’s student ID number
3. Verify that the following formulae are functions from *E* to *F* . **(3)**
   1. ;
   2. ;
   3. ; smallest integer greater than or equal to e
4. Given and and where   
    and . **(6)**

In the following problems, determine whether the functions given are everywhere defined, one-to-one, or onto.

1. *A* = { 1, 2, 3, 4, 5}, *B* = *A* *f* = { (1,2), (2,3), (3,4), (4,5), (5,1) } **(3)**
2. *A* = { 1, 2, 3, 4, 5}, *B* = *A* *f* = { (1,1), (2,3), (3,2), (4,5), (5,5) } **(3)**
3. *A* = { 1, 2, 3, 4, 5}, *B* = *A* *f* = { (1,1), (2,3), (4,2), (5,4) } **(3)**
4. *A* = { 1, 2, 3, 4, 5}, *B* = *A* *f* = { (1,1), (2,2), (3,4), (4,5), (5,2) } **(3)**