Guideline

Please submit your solutions in a single PDF on Blackboard. Multiple submissions are possible before the due time; the last submission will be graded.

Exercise 1.(points = 10)

Let A = {1,2,3,4} and B = {a,b,c}. Give an example of a function f: A -> B that is neither one-to-one nor onto. Diagrams will suffice.

Exercise 2. (points = 18)

Consider the sine function sin: R -> [-1, 1]. Determine

1. whether this function is one-to-one and
2. whether it is onto.

Explanation is not needed.

Exercise 3.(points = 18)

A function f : Z → Z is defined as f(n) = 2n + 1. Determine

1. whether this function is one-to-one and
2. whether it is onto.

Explanation is not needed.

Exercise 4.(points = 18)

A function f: Z → Z × Z is defined as f(n) = (2n, n + 3). Determine

1. whether this function is one-to-one and
2. whether it is onto.

[Hint: a pair (p,q) is equal to another pair (p',q') if and only if p = p' and q = q'.]

Explanation is not needed.

Exercise 5.(points = 18)

A function f : Z × Z → Z is defined as f(m,n) = 2n – 4m. Determine

1. whether this function is one-to-one, and

2. whether it is onto.

Explanation is not needed.

Exercise 6.(points = 18)

A function f : Z × Z → Z is defined as f(m,n) = 3n – 4m. Determine

1. whether this function is one-to-one and
2. whether it is onto.

Explanation is not needed.