School of Engineering   Discrete Math I
Department of Basic Sciences   December 8, 2018
                                                                      Second Exam

Student name: |_____   Student number: |_____

1. (3 points) Determine whether each of the following statements is true or false

    (i) To show that p implies q trivially, one uses the fact the p is false and the proof follows.

    (ii) We can define an onto function $f : \{1, 2, 3\} \to \{\{1\}, \{\phi\}, 3, \phi\}$.

    (iii) Suppose that $f : A \to B$ is surjective. Then $|B| = |f(A)|$.

2. (2+2+2 points) Fill in the blanks:

    (i) To show that p implies q by contradiction. We assume..........................., and show that...........

    (ii) Given that $\lfloor 2 - x \rfloor = 5$. The solution set for x is

    (iii) Let $f(x) = \lceil x + 1 \rceil$. Then $f([0, 3]) =$

3. (1 point) Suppose that the universal set $U = \{a, b, c, d, e, f, g, h\}$. Find the subset of U with bit string not containing the bit 0.

4. (2 points) Let $A = \{1, \phi\}$. Find $P(A)$.

5. (3 points) Let A and B be two sets. Show that $A - \overline{B} = A \cap B$.

6. (2+1 points) Let $A_i = \{i - 2, i, i + 2\}$. Find $\displaystyle\bigcup_{i=1}^{\infty} A_i$ and $\displaystyle\bigcap_{i=1}^{\infty} A_i$.

7. (3 points) Show that if x^3 is irrational, then x is irrational.

8. (4 points) Show that the function $f : (1, \infty) \rightarrow (0, \infty)$ given by $f(x) = \dfrac{1}{\sqrt{x-1}}$ is a one to one correspondence.