MATH/EECS 1019: Discrete Math for Computer Science
Fall 2014
Assignment 1 Hints

Question 2

Since this question confused many, here are some hints. For the first 2 parts, read examples 6,7 on pages 73-74. You can use a similar format for answering the assignment questions. For the third part, study example 12 on page 76. Here are two more simple examples.

1. $p \to q$
   $q \to r$
   p
   $\therefore r$

   Solution:

1.	$p \to q$	Premise
2.	p	Premise
3.	q	Modus Ponens
4.	$q \to r$	Premise
5.	r	Modus Ponens

2. $p \to r$
   $p \wedge q$
   $\therefore r$

   Solution:

1.	$p \wedge q$	Premise
2.	p	Simplification
3.	$p \to r$	Premise
4.	r	Modus Ponens

Question 3

1. One way is to negate the sentence that the equation has at least one solution over the natural numbers. For this question and the next, define your own predicates as convenient.

2. There are two parts to this question – first there exists a solution and second the solution is unique. One way of expressing the uniqueness is by saying that if there are two solutions they must be equal.

Question 4

[4 points] This question confused people because of parts like $\forall x \in \mathbb{N}$. Some people suggested negating this would result in $\forall x \notin \mathbb{N}$ or something else. Mentally detach the part "$\in \mathbb{N}$" from the quantifiers and negate them as usual. So negating $\forall x \in \mathbb{N}$ would result in $\exists x \in \mathbb{N}$.

Question 5

Define your own predicates and translate the sentences into predicate logic and then negate them if that helps.