MATH 147 : Honours Calculus 1: Advanced

Electronic Assignment #1

Instructions:

- Ensure you have read and completed "Chapter 1: A Short Introduction to Mathematical Logic and Proof" in the Course Lecture Notes. You will require this information to complete the following questions.
- Read and complete the following assignment.

Part 1: Multiple Choice: Choose the best answer. (1 mark each)
[There are 12 possible marks, but the assignment will be counted out of 10.]

The following questions are based on material in your course notes.

For each of the following questions choose the best answer:

1) To prove the statement "$\forall n \in \mathbb{N} : P(n)$ " it suffices to give one example.

a) True
b) False
c) Not enough information.

2) To prove the statement "$\exists n \in \mathbb{N} : P(n)$" it suffices to give one example.

a) True
b) False
c) Not enough information.

3) To show that the statement "$\forall n \in \mathbb{N} : P(n)$" is false, it suffices to give one example.

a) True
b) False
c) Not enough information.

4) To show that the statement "$\exists n \in \mathbb{N} : P(n)$ " is false, it suffices to give one example.

a) True
b) False
c) Not enough information.

5) The statement "6 is larger than every member of the empty set $\emptyset$" is:

a) True
b) False
c) Not enough information.

6) The statement "I **always** lie" cannot be true.

a) True
b) False
c) Not enough information.

7) If we know that p is true but q is false, then $p \Rightarrow q$ is:

a) True
b) False
c) Not enough information.

8) If we know that $\neg q \Rightarrow \neg p$ is true, then $p \Rightarrow q$ is:

a) True
b) False
c) Not enough information.

9) $\neg q \Rightarrow \neg p$ is called:

a) The negation of $p \Rightarrow q$.
b) The contrapositive of $p \Rightarrow q$.
c) None of the above

10) To prove a statement p using a proof by contradiction, we assume the statement $\neg p$ is true and show it leads to a contradiction.

a) True
b) False
c) Not enough information

11) If $[(p \vee q) \Rightarrow r]$ is true and p is true, then r is true.

a) True

b) False

c) Not enough information

12) If $[(p \wedge q) \Rightarrow r]$, and if p is true but r is false, then q is:

a) True

b) False

c) Not enough information