Discrete Structures

CS21001

Tutorial 3

8th August, 2018

Question No. 1

Write the following arguments in symbolic form and either *verify* the validity of the argument or *explain* why it is invalid.

Everyone in the class has a graphing calculator. Everyone who has a graphing calculator understands the trigonometric functions.

Conclusion

Amit, who is in the class, understands trigonometric functions.

Question No. 2

Write the following arguments in symbolic form and either *verify* the validity of the argument or *explain* why it is invalid.

All credit union employees must know COBOL. All credit union employees who write loan applications must know Excel. Sonia works for the credit union, but she does not know Excel. Amit knows Excel but does not know COBOL. Therefore, Sonia does not write loan applications and Amit does not work for the credit union.

N.B. : *Assume that the universe comprises all adults (18 or over). Amit and Sonia are two of these individuals.*

Question No. 3

Obtain

- Principal Disjunctive Normal Form and
- Principal Conjunctive Normal Form for,

$$(\neg p \vee \neg q) \rightarrow (p \iff \neg q)$$

Question No. 4

Prove the following statement by contradiction.

Statement

For all integers k and l, if both k and l are odd, then $k + l$ is even.

Question No. 5

Prove the following statement by contradiction.

Statement

There are infinitely many primes.

Question No. 6

Prove the following statement by contradiction.

Statement

$\sqrt{2}$ is an irrational number.

Question No. 7

Prove the following statement by contradiction.

Statement

For every integer n, if n^2 is odd, then n is odd.

Question No. 8

Prove the following statement by contraposition.

Statement

If m^2 is even then m is even.

Question No. 9

Prove the following statement.

Statement

Let n be an integer. Then n is odd if and only if $7n + 8$ is odd.