MATH 2710

2.4 - 2.9 Portfolio

Question 1:

a) Define the biconditional statement as the conjuction of two conditional statements.

b) State the "iff" form of a biconditional statement.

c) State the "necessary and sufficient" form of a biconditional statement.

d) State the "equivalent" form of a biconditional statement.

Question 2:

a) Give two examples of biconditional statements in the "iff" form.

b) Give two examples of biconditional statements in the "necessary and sufficient" form.

c) Give two examples of biconditional statements in the "equivalent" form.

Question 3:

a). When is "P iff Q" true (in terms of the truth values of P and Q)?

b). What are the two required steps to prove that "P iff Q" is true?

Question 4:

a). Define when two statements are logically equivalent.

b). To what compound statement is the statement $(P \lor Q) \land (\neg(P \land Q))$ logically equivalent?

Question 5:

a) Give two examples of true mathematical statements of type $P \iff (Q \lor R)$.

b) To what compound statement is $((\neg P) \lor Q)$ logically equivalent?

c) State De Morgan Laws for Logic.

d) What is the negation of $P \Rightarrow Q$? Justify your answer.

Question 6:

a) What is the negation of "$\forall x \in X, P(x)$"?

b) What is the negation of "$\exists x \in X, P(x)$"?

c) Give two example for each of the above two cases.

Question 7:

a) What is the negation of "$\forall x \in X, \exists y \in Y, P(x, y)$"?

b) What is the negation of "$\exists x \in X, \forall y \in Y, P(x, y)$"?

c) Give two example for each of the above two cases.

Question 8:

a) What hidden words are in front of "$P(x) \Rightarrow Q(x)$"?

b) What is the negation of "$P(x) \Rightarrow Q(x)$"?

c) When is "$P(x) \Rightarrow Q(x)$" true?

d) When is "$P(x) \Rightarrow Q(x)$" false?

Question 9:

a) State the "every" form of a conditional statement of type "$(x \in X) \Rightarrow Q(x)$".

b) Give two examples of conditional statement in the "if" form that you shall put in the "every" form.

c) Give two examples of conditional statement in the "every" form that you shall put in the "if" form.