

DISCRETE MATHEMATICS, CLASS EXERCISE 2

- (1) Use a truth table to judge the validity of the following argument

$$p \rightarrow (q \rightarrow r), (p \vee \neg q) \wedge q \vdash q \rightarrow r$$

- (2) Use propositional logic to establish that the following argument is valid

$$p \rightarrow q, p \rightarrow (q \rightarrow r) \vdash p \rightarrow r$$

- (3) Use propositional logic to establish the validity of the following argument

$$\neg(p \wedge q), \neg(\neg r \wedge p), \neg(r \wedge \neg q) \vdash \neg p$$

- (4) Rewrite the following argument in logical notation and then use propositional logic to establish the validity of the argument.

If the birds are flying south and the leaves are turning, then it must be fall. Fall brings cold weather. The leaves are turning but the weather is not cold. Therefore, the birds are not flying south.

Use the letters B, L, F, C for the elementary propositions in the argument.