2.4 Conditional and Biconditional

1.Complete truth tables for the following logical statements:

(a) $\sim q \rightarrow \sim p$

(b) $\sim p \rightarrow (p \vee q)$

(c) $p \rightarrow (q \wedge \sim r)$

(d) $(q \vee \sim r) \rightarrow (p \wedge \sim q)$

2. Use truth tables to argue that $p \rightarrow (q \wedge r)$ is logically equivalent to $(p \rightarrow q) \wedge (p \rightarrow r)$.

3. In each write out the (i) contrapositive, (ii) converse and (iii) inverse of the given conditional statement.

(a) If you score 100% on each exam, then you will earn an *A* grade in the course.

(i) contrapositive:

(ii) converse:

(iii) inverse:

(b) If the horse does not run fast, then the horse will lose the race.

(i) contrapositive:

(ii) converse:

(iii) inverse:

4. Assume *m* represents "living in Minnesota", *c* represents living in Clay County (of Minnesota)" and *h* represents "living in Moorhead (of Clay County).

(a) Symbolize each of the following:

(i) One is living in Minnesota if one is living in Moorhead.

(ii) One can live in Clay County only if one lives in Minnesota.

(iii) Living in Minnesota is not sufficient for living in Moorhead.

(b) In each fill in the slot with the appropriate word - either "necessary" or "sufficient" and then symbolize the compound statement.

(i) Living in Moorhead is _____ for living in Minnesota.

(ii) Living in Minnesota is _____ for living in Clay County.