

| p | q | r | $p \vee q$ | $\sim r$ | $(p \vee q) \rightarrow \sim r$ |
|---|---|---|------------|----------|---------------------------------|
| T | T | T | T          | F        | F                               |
| T | T | F | T          | T        | T                               |
| T | F | T | T          | F        | F                               |
| T | F | F | T          | T        | T                               |
| F | T | T | T          | F        | F                               |
| F | T | F | T          | T        | T                               |
| F | F | T | F          | F        | T                               |
| F | F | F | F          | T        | T                               |

(ii) Suppose we set

f = the fish is cooked.

r = dinner is ready.

h = I am hungry.

(a)  $f \rightarrow (r \wedge h)$

(b)  $(f \rightarrow r) \wedge h$

| f | r | h | $r \wedge h$ | $f \rightarrow (r \wedge h)$ | $f \rightarrow r$ | $(f \rightarrow r) \wedge h$ |
|---|---|---|--------------|------------------------------|-------------------|------------------------------|
| T | T | T | T            | T                            | T                 | T                            |
| T | T | F | F            | F                            | T                 | F                            |
| T | F | T | F            | F                            | F                 | F                            |
| T | F | F | F            | F                            | F                 | F                            |
| F | T | T | T            | T                            | T                 | T                            |
| F | T | F | F            | T                            | T                 | F                            |
| F | F | T | F            | T                            | T                 | T                            |
| F | F | F | F            | T                            | T                 | F                            |

#### Exercise 1.2,4.

Build a truth table for  $p \rightarrow (q \rightarrow r)$  and  $(p \wedge q) \rightarrow r$ .