

► **Review 1-10** Determine the validity of each of the following arguments. If the argument is one of those listed in the text, name it.

(a) Either I wear a red tie or I wear blue socks.

Either I wear a green hat or I do not wear blue socks.

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Either I wear a red tie or I wear a green hat.

(b) If I like mathematics, then I will study.

Either I don't study or I pass mathematics.

If I don't pass mathematics, then I don't graduate.

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If I graduate, then I like mathematics.

**Solution.** (a) Let  $p$ ,  $q$ , and  $r$  be the statements.

$p$  = "I wear a red tie";  $q$  = "I wear blue socks"; and  $r$  = "I wear a green hat".

This given arguments is

$$\begin{array}{l} p \vee q \\ r \vee (\neg q) \\ \hline p \vee r \end{array}$$

By the rule of resolution, this argument is valid.

(b) Let  $p$ ,  $q$ ,  $r$ , and  $s$  be the statements.

$p$  = "I like mathematics";  $q$  = "I study";  $r$  = "I pass mathematics"; and  $s$  = "I graduate".

This given arguments is

$$\begin{array}{l} p \rightarrow q \\ (\neg q) \vee r \\ (\neg r) \rightarrow (\neg s) \\ \hline s \rightarrow p \end{array}$$

This argument is not valid because when  $s$  and  $r$  are true and  $p$  is false, the hypotheses are true, while the conclusion is false.

□