Discrete Mathematics
Drill-1

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1 Drill 1

Mr. Nguyen runs a mail order expensive jewelry business. His mode of operation is to use boxes with personal coded locks to exchange money and jewelry. Once a customer initiates a transaction, Mr. Nguyen can send him a an open box where the customer can code a private number and lock the box. Every open box can be intercepted by intruders and its content will be stolen. A locked box will always reach its destination.
How can Dung buy safely an expensive diamond ring from Mr. Nguyen?

Let p, q and s be the propositions:

1. p: you drive your xe may in Hanoi over 80 km an hour.

2. q: the police stops you.

3. s: the police takes away your xe may.

Write a sentence that means: $s \rightarrow p \wedge q$

Write the following propositions using the Boolean variables p, q, s and Boolean operators:

1. The police do not stop you.

2. You drive over 80 km an hour, the police stops you but they do not take away your xe may.

3. If you do not drive over 80 km an hour then the police will not stop you and they will not take away you xe may.

Construct the truth table for the following compound propositions:

1. $(\neg p \leftrightarrow \neg q) \leftrightarrow (p \leftrightarrow q)$

2. $((p \rightarrow q) \rightarrow r) \rightarrow s$

3. $(p \leftrightarrow q) \leftrightarrow (r \leftrightarrow s)$

Show that the following pairs are logically equivalent:

1. $p \vee (q \wedge r), (p \vee q) \wedge (p \vee r)$

2. $(p \wedge q) \rightarrow (p \vee q)$, **TRUE**