Roll - 1705045

Chapter - 1 ; Section - 1.

To be verified by 1705066

Question :—

15.

Let p, q and r be the propositions

p : Grizzly bears have been seen in the area.

q : Hiking is safe on the trail.

r : Berries are ripe along the trail.

Write those propositions using p, q, r and logical connective (including negation).

a) Berries are ripe along the trail, but grizzly bears have not been seen in the area.

b) Grizzly bears have not been seen in the area and hiking on the trail is safe, but berries are ripe along the trail.

c) If berries are ripe along the trail, hiking is safe if and only if grizzly bears

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have not been seen in the area.

d) It is not safe to hike on the trail, but grizzly bears have not been seen in the area and berries along the trail are ripe.

e) For hiking on the trail to be safe, it is necessary but not sufficient that berries not be ripe along the trail and for grizzly bears not to have been seen in the area.

f) Hiking is not safe on the trail whenever grizzly bears have been seen in the area and berries are ripe along the trail.

Answers:—

a) Here "But" is as same as "And". So this has to be $r \wedge \neg p$.

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b) $\neg p \wedge q \wedge r$.

Parentheses is not necessary because of agreement of precedence.

c) It is $r \rightarrow (q \leftrightarrow \neg p)$

d) $\neg q \wedge \neg p \wedge r$

e) It states that the condition "is necessary" is a conditional statement in one direction and this condition "is not sufficient" is the negation of the conditional statement in the other direction. So, it is,

$(q \rightarrow (\neg r \wedge \neg p)) \wedge \neg((\neg r \wedge \neg p) \rightarrow q)$

there are some other answers.

f) "whenever" denotes "if". So, it is ~~$(p \wedge r) \rightarrow q$~~

$(p \wedge r) \rightarrow \neg q$.

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