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DSGT TUTORIAL-1

1) Determine whether each of following sentences are statements (or propositions) or not?

a) In 1990 George Bush was the president of United States
→ The given sentence is proposition.

b) X+3 is a positive number.
→ The given sentence is not proposition.

c) If only every morning could be sunny and clear as this one!
→ The given sentence is not proposition.

d) Fifteen is an even number.
→ Given sentence is proposition.

e) If Jenifer is late for party, then her cousin Zachary will be quite angry.
→ Given sentence is proposition

f) What time is it?
→ Given sentence is not proposition

g) From the halls of Momente zuma to shores of tripoli.
→ Given sentence is not proposition

h) As of June 30, 1986, Christine Marie Evroet had won French open seven times.
→ Given sentence is proposition.

2) Let p and q be propositions;
p: It is below freezing
q: It is snowing
Write these proposition using p and q and logical connectives. (including negations)

a) It is below freezing and snowing.
→ $p \wedge q$

b) It is below freezing but not snowing.
→ $p \wedge \neg q$

c) It is not below freezing and it is not snowing.
→ $\neg p \wedge \neg q$

d) It is either snowing or below freezing (or both).
→ $p \vee q$

e) If it is below freezing, it is also snowing
→ $p \rightarrow q$

f) Either it is below freezing or it is snowing, but it is not snowing if it is below freezing
→ $(p \vee q) \wedge (\neg q \rightarrow p \rightarrow \neg q)$

g) That it is below freezing is necessary and sufficient for it to be snowing.
→ $p \leftrightarrow q$

3) Let p, q, and r be the propositions
p: You have the flu.
q: You miss the final examination
r: You pass the course.

a) $p \rightarrow q$
→ If you have the flu then you will miss the final examination.

b) $\neg q \leftrightarrow r$
→ You will not miss the final examination if and only if you pass the course.

c) $q \rightarrow \neg r$
→ If you miss the final examination then you will not pass the course.

d) $p \vee q \vee r$
→ Either you have the flu or you will miss the final examination or you pass the course.

e) $(p \wedge q) \vee (\neg q \wedge r)$
→ You have the flu and you miss the final examination or you not miss the final examination and you pass the course.

f) $(p \rightarrow \neg r) \vee (q \rightarrow \neg r)$
→ If you have the flu then you not pass the course and if you miss the final examination then you not pass the course.

4) Suppose I tell Seema that if she gets a 93% on her final, then she will get an A in the class. Assuming that what I said is true, what can you conclude in the following cases:

i) She gets a 93% on her final.

p: She gets 93% on her finals
q: She will get an A in the class.

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

→ According to truth table we can ~~conclude~~ conclude that she will get an A in class

ii) She gets an A in the class.
→ We can't conclude that she gets 93% in her finals. She may get or may not.

iii) She does not get a 93% on her final.
→ In this case also, we can't conclude anything. She may get A in her class or may not.

iv) She does not get an A in the class.
→ According to truth table, we can conclude that she has not got 93% in her finals.