~~05DDT18F1002~~
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worksheet 1

1 a) ~~2~~+7 = 10 False.

This is ~~unknown~~ proposition.

x+7 = 10.
This is not proposition.
because x is an unknown.

b) 4+7 > 11

This is proposition and truth values is false

c) A triangle is a four-sided polygon

This is proposition and the truth values ~~is~~ false because triangle only have three-Sided polygon.

d) This sentence is false.

This is ~~proposition~~ ~~the~~ ~~truth~~ values Command ?

Not proposition.

e) Tea comes with dinner.

This is proposition and the truth values is True.

~~either true or false.~~

f) What is your auntie's name? Not proposition.

It is ~~a~~ question.

2 a) Proposition

- A proposition is typically expressed as a declarative sentence which is either true or false but not both.

b) Compound Statement

- Statements or propositional variables can be combined by logical Connectives to obtain compound Statements.

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3. a) P and R

- A week has seven days and there are 60 minutes in an ~~doctor~~ hour. The truth values is true.

b) P ∧ Q

- A week has seven days and there are 20 hours ~~in~~ a day. The truth values is false because there are 24 hours only in a day.

c) R or Q

- There are 60 minutes in an hour or there are ~~24~~ hours in a day. The truth values is true because there are 60 minutes in an hour.

d) Q ∨ P

- There are 20 hours ~~in~~ a day or ~~there are 60 minutes in an hour~~ a week has seven days. The truth values is ~~€~~ true because ~~there a week~~ are seven days in a week.

4. Truth table based on question 3

~~for~~ ~~2 and~~ R

(b) (d)

for two variables

P	Q	P ∧ Q	Q ∨ P
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	F

3 variables

P	Q	R	P ~~and~~ ∧ R	R ~~or~~ ∨ Q	P∧Q	Q∨P
T	T	T	T	T	T	T
T	T	F	F	T	T	T
T	F	T	T	T	F	T
T	F	F	F	F	F	T

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Negation and truth table

There exists a classroom in which no chair is broken.

5. a) All classrooms have at least one chair that is broken.

- It is not the case that all classrooms have at least one chair that is broken. ✓

b) No classroom has only chairs that are broken

- It is not the case that no classrooms has only chairs that are broken. There exists a classroom that has only chairs that are not broken.

c) Every student in this class has taken discrete mathematics or computing mathematics.

- It is not the case that every student in this class has taken discrete mathematics or computing mathematics. ✓

There exists a student in this class who has neither taken discrete mathematics nor computing mathematics.

6. a) $\sim q \rightarrow (\sim p \vee q)$

p	q	$\sim p$	$\sim q$	$(\sim p \vee q)$	$\sim q \rightarrow (\sim p \vee q)$
T ✓	T	F ✓	F	T F ✓	F ✓ T
T ✓	F	F ✓	T	F ✓	F ✓
F ✓	T	T ✓	F	T ✓	T ✓
F ✓	F	T ✓	T	T ✓	T ✓

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b) $(p \wedge q) \vee \sim p$

p	q	$p \wedge q$	$\sim p$	$(p \wedge q) \vee \sim p$
T	T	T	F	T
T	F	F	F	F
F	T	F	T	T
F	F	F	T	T

c) $(\sim p \rightarrow q) \vee (\sim p \wedge \sim q)$

p	q	$\sim p$	$\sim q$	$(\sim p \rightarrow q)$	$(\sim p \wedge \sim q)$
T	T	F	F	(F) T	F
T	F	F	T	T	F
F	T	T	F	T	F
F	F	T	T	(T) F	T

$(\sim p \rightarrow q) \vee (\sim p \wedge \sim q)$
F T T
T T
T T
T T

$A \rightarrow B$ (A: condition, B: consequences.)