Assignment week 2

1. Textbook Section 1.1 exercise 1

a) Boston is the Capital city of Masschusett

Yes, True, because this is a claim can only be true or false, Boston can be either the capital city of Masschusett or not, and it is.

b) Miami is the Capital city of Florida

Yes, false, Same as a), but Miami is not the Capital city of Florida

c) 2+3=5

Yes, True, the numberic equation can only be True or False, and 2+3 equals to 5 numberically.

d) 5+7=10

Yes, false, Same as c), but 5+7 not equal to 10 numberically.

e) x+2=11

No, it doesn't have a sure case, the truth value of it depans on value of x

2. Give Five emample of compound propositions that consistant of three atomic propositions each

1) $(p \wedge q) \rightarrow (q \vee p) \wedge p$ 2) $\neg p \wedge p \vee \neg p$ 3) $\neg p \rightarrow q \rightarrow \neg p$

4) $(p \vee \neg p) \vee (q \wedge \neg q) \rightarrow p$ 5) $(p \rightarrow q) \vee (q \rightarrow r) \rightarrow r$

3. let P be "He is poor" and let q be "He is unhappy". Describe the following propositions in English.

a) $\neg p$: He is not poor

b) $p \wedge q$: He is poor and unhappy

c) $p \vee q$: He is poor or unhappy

d) $q \vee \neg p$: He is poor, or he is not unhappy

4. Let p be "he is hardworking", q be "he is smart", write each of the statements in symbolic form.

a) He is hardworking and smart: $p \wedge q$

b) He is hardworking but not smart: $p \wedge \neg q$

c) It is false that he is not hardworking or smart: $\neg(p \vee q)$

d) He is either hardworking nor smart: $\neg p \wedge \neg q$

5. let p be "There is a sale" and let q be "The parking lot is full", write the following statement in symbolic form

a) There is a sale only if parking lot is full: $p \leftrightarrow q$

b) A necessary condition for parking lot to be full is that there is a sale: $q \rightarrow p$

c) A sufficient condition for parking lot to be full is that there is a sale: $q \rightarrow p$

6. Section 1.1 exercise 24

a) It is necessary to wash the boss's car to get promotion.

If you get promotion, then you have washed boss's car.

b) Winds from South imply a spring thaw

If there is a spring thaw, then there were wind from South

c) A sufficient condition for the warranty to be good is that you bought a computer less than a year ago.

If you bought a computer less then a year ago, then the warranty is good

d) Willy get caught whenever he cheat

If willy cheat, then he get caught

e) You can access the website only if you pay a subscription fee.

If you paid a subscription fee, then you can access the website.

f) Getting elected follows from knowing the right people

If you get elected, then you knowed the right people

g) Carol get seasick whenever she is on a boat

If Carol is on a boat, then she get seasick

7. Determine the truth value of the following statement

a) If Austin is the capital city of Oklahoma, then 9 is a prime number

P: Austin is the capital city of Oklahoma
q: 9 is a prime number
$p \rightarrow q$, where $p = F$, $q = F$, therefore, $p \rightarrow q = T$ (Vacuous Truth)

Statement is True

b) If Austin is the capital city of Texas, then 9 is a prime number

p: Austin is the capital city of Texas
q: 9 is a prime number
$p \rightarrow q$, where $p = T$, $q = F$, therefore, $p \rightarrow q = F$

Statement is False

c) Austin is the capital city of Oklahoma iff 9 is a prime number

P: Austin is the capital city of Oklahoma
q: 9 is a prime number
$p \leftrightarrow q$, where $P = F$, $q = F$, therefore, $P \leftrightarrow q = T$

Statement is True

8 using the truth table to show $Pv(q \wedge r) \equiv (Pvq) \wedge (Pvr)$

p	q	r	$Pv(q \wedge r)$	$(Pvq) \wedge (Pvr)$
T	T	T	T	T
F	T	T	T	T
T	F	T	T	T
T	T	F	T	T
F	F	T	F	F
F	T	F	F	F
T	F	F	T	T
F	F	F	F	F

9 Section 1.2, exercise 8

a) The user has paid the subscription fee but does not enter a valid password

$r \wedge \neg p$

b) Access is granted whenever the user has paid the subscription fee and entered a valid password

$q \leftrightarrow (p \wedge r)$

c) Access is denied if the user has not paid the subscription fee

$\neg r \rightarrow \neg q$

d) If the user has not entered a valid password but has paid the subscription fee, then access gained

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

10. let p be the proposition "I finished all deadline on time", q be "I get a promotion", Express each of these as a combination of p and q.

a) I will get a promotion only if I finished all dead line at time.

$p \leftrightarrow q$

b) I will get a promotion and I will finish all deadline at time

$q \wedge p$

c) Either I will not get a promotion or I will not finish all deadline at time

$\neg q \vee \neg p$

d) For me to get a promotion, it is necessary and sufficient that I finished all dead line on time

$q \rightarrow p$