Quiz Tues Jan 23 Section 1.4
Tues Jan 30 2.2

Test 1
Not open Book
Wed Jan 31
1.1-1.5, 2.1-2.3 (6 Questions, with parts)
Bring calculator
No other devices allowed
Practice Problems on website

2.1 Intro to Logic

Logical proposition: A statement that is true or false.

Examples of logical propositions:
Python is a coding language. (TRUE)
7 is an even integer. (FALSE)

Not logical propositions:
Put your books away!
Where is Saryta's office?
He is a programmer.
↑ vague

We use symbols p, q, r, s, t ...
to represent logical propositions.

Ex: Let p = "Leah drinks coffee."

$\sim p$ is the negation of p.
Pronounced "not p"

$\sim p$ is TRUE when p is FALSE.
$\sim p$ is FALSE " TRUE.

Ex: p = "I have at most two siblings." (0, 1, 2)
$\sim p$ = "I have more than two siblings." (3, 4, ...)

Ex: Write the negation of:

a) p = "All of us are going to study."
$\sim p$ = "At least one of us is not going to study."

b) q = "None of us are going to study."
$\sim q$ = "At least one of us is going to study."

c) r = "My Visa balance is positive."
$\sim r$ = "My Visa balance is not positive."

$p \wedge q$: p and q

$p \wedge q$ is TRUE when both p and q are TRUE.
$p \wedge q$ is FALSE otherwise.

$p \vee q$: p or q (INCLUSIVE OR)

$p \vee q$ is TRUE when at least one of p, q are TRUE.
$p \vee q$ is FALSE otherwise.

$p \oplus q$: p exclusive or q

$p \oplus q$ is TRUE when exactly one of p, q is TRUE.
$p \oplus q$ is FALSE when p, q are both true!
$p \oplus q$ is FALSE " false.

Ex: p is FALSE and q is TRUE.
State the truth value of:

a) $p \vee q$ TRUE

b) $p \oplus q$ TRUE

c) $p \wedge q$ FALSE

d) $\sim q$ FALSE

Note: Inclusive or allows both propositions to be true.
Exclusive or allows only one proposition to be true.

Ex: Is the "or" exclusive or inclusive?

a) Would you like milk or sugar? INCLUSIVE

b) Are you going to the party or not? EXCLUSIVE

Order of Operations

$\sim$ is done first

then $\wedge$

then $\vee$, $\oplus$

Brackets override the order

$p \vee q \wedge r$ is the same as $p \vee (q \wedge r)$

$\sim p \vee q$ = $(\sim p) \vee q$

negation of $p \vee q$ = $\sim (p \vee q)$

$p \vee \sim q \wedge r$ = $p \vee ((\sim q) \wedge r)$