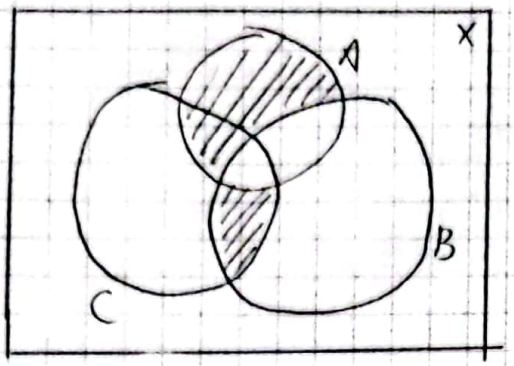
MLFCS - test 1

Q1

(a) (i)



$(A \setminus B) \cup ((B \cap C) \setminus A)$

(ii) $(A \cap \bar{B}) \cup ((B \cap C) \cap \bar{A})$

(iii) $D = \{-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6\}$

$D \cap E = \{-6, -3, 0, 3, 6\}$

(b) (i)

x	0	1	2	3	4	5
0	0	0	0	0	0	0
1	0	1	2	3	4	5
2	0	2	4	0	2	4
3	0	3	0	3	0	3
4	0	4	2	0	4	2
5	0	5	4	3	2	1

not satisfy

(ii)
```
x ← 0
s ← 0
while (x<0) {
    x ← x+1
    s ← s + 2*x - 1 }
return s
```

$S = 0 + 2\times1 - 1 + 2\times2 - 1 + 2\times3 - 1 \cdots + 2\times x - 1$

$S = 2(1 + \cdots + x) - 1 \times x$

$S = 2 \times \frac{(1+x)x}{2} - x$

$S = x + x^2 - x = x^2$

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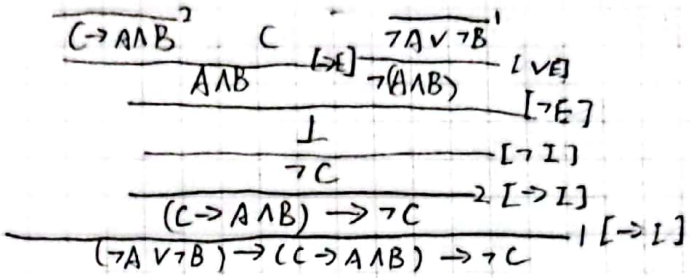
(c) Countable

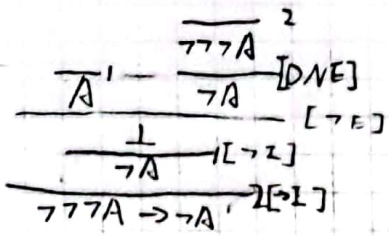
As the length of array is specified as an int variable

Q2

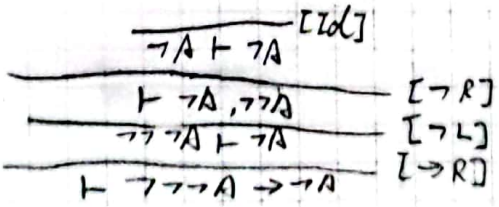
(a) $(\neg A \vee \neg B) \to ((C \to A \wedge B) \to \neg C)$



(b) (i) $\neg\neg\neg A \to \neg A$



(ii) $\neg\neg\neg A \to \neg A$



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(c) $(\neg P \to Q \wedge R) \to P \vee R$

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{}{\neg P, Q, R \vdash R}\,[id]}{\neg P, Q \wedge R \vdash R}\,[\wedge R] \qquad \dfrac{}{\neg P \vdash P, R}\,[id]}{\neg P \to Q \wedge R, \neg P \vdash R}\,[\neg R]}{\neg P \to Q \wedge R \vdash P, R}\,[\vee R]}{\neg P \to Q \wedge R \vdash P \vee R}\,[\to R]}{\vdash (\neg P \to Q \wedge R) \to P \vee R}$$

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