

~~Problem~~

Problem 4

a.

① Convert to CNF

$$KB = \{ (A \vee B) \rightarrow C, A \} = \{ \neg(A \vee B) \vee (C, A) \}$$

de Morgan

$$\{ (\neg A \wedge \neg B) \vee (C, A) \}$$

$$= \{ (A \vee C) \wedge (\neg B \vee C), A \}$$

② Apply Modus ponens:

$$KB = \{ \neg A \vee C, \neg B \vee C, A \} = \{ A \rightarrow C, B \rightarrow C, A \}$$

If we know A, ~~then~~ ^{and} ~~A~~ $A \rightarrow C$, we can \downarrow
derive C using the relation in $KB, = \{ A \rightarrow C, A \}$

b.

① Convert to CNF

$$KB = \{ (A \vee B), \neg B \vee C, \neg(A \vee C) \vee D \}$$

$$= \{ (A \vee B), (\neg B \vee C), (\neg A \wedge \neg C) \vee D \}$$

$$= \{ (A \vee B), (\neg B \vee \neg C), (\neg A \vee \neg D) \wedge (\neg C \vee \neg D) \}$$

$$= \{ (A \vee B), (\neg B \vee \neg C), (\neg A \vee \neg D), (\neg C \vee \neg D) \}$$

② Apply the resolution rule.

$$\rightarrow KB = \{ A \vee C, \neg A \vee \neg D, \neg C \vee \neg D \}$$

$$= \{ A \vee D, \neg A \vee \neg D \}$$

$$= \{ D \}$$

Problem 5.

b. ① Suppose we have a finite set of ²ⁱ⁺¹ numbers.

② Every number n has a unique successor S and $S > n$. Also, n 's predecessors are called P .

③ They will become

$$P_1 < \dots < P_2 < P_1 < n < S_1 < S_2 < S_3 < \dots < S_i \rightarrow \text{no successor available?}$$

④ Since S_i must also have a successor, S_i must be greater than itself

⑤ This contradicts the 7th condition.