$D = \{z \in \mathbb{Z} \mid z \in A\} = \{3,4,5,6,8\}$

$\{z \mid z \in A\}$

$A = \{3,4,5,6,8\}$

$\cancel{\emptyset}\ E = \{A\}$

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

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

$(A \cup B)^C = A^C \cap B^C$

$(A \cap B)^C = A^C \cup B^C$

Disjunctive Normal Form.

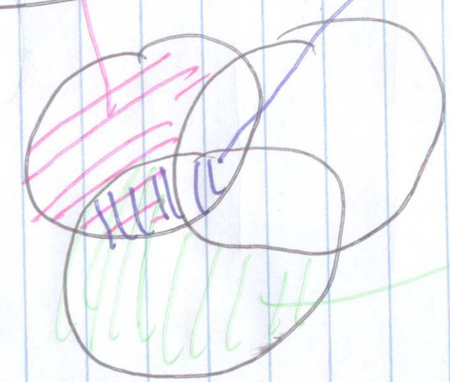
~~Or / ... of~~

Or / Union of:

And / Intersection of:

Sets / Complements

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



Quine-McClusky

Ex : $(A\cap B)^c \cap (B\cup C)$

$$= \boxed{(A^c \cup B^c)} \cap (B \cup C)$$

$$= \left(\boxed{A^c\cup B^c} \cap B\right) \cup \left(\boxed{A^c \cup B^c}\cap C\right)$$

$$\left((A^c\cap B)\cup \underbrace{(B^c\cap B)}_{=\emptyset}\right) \cup \left((A^c\cap C)\cup(B^c\cap C)\right)$$

$$(A^c\cap B)\cup(A^c\cap C)\cup(B^c\cap C)$$

Mathematical statements / Theorems / Lemma

- Sets / Elements
- Predicates: True/False condition on elements
- Quantifiers
  - For All $\forall$
  - there exists: $\exists$

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ex: $E = \{x \in \mathbb{Z}_{\geq 0} \mid x \text{ even}\}$

$\underbrace{\mathbb{Z}_{\geq 0}}_{\text{nonneg. integers}}$

$D = \mathbb{Z}_{\geq 0} \setminus E = \{x \in \mathbb{Z}_{\geq 0} \mid x \text{ odd}\}$

- Even Nr + 1 is odd: $\forall x \in E: x+1 \in D$
- The sum of two odd is even: $\forall x, y \in D: x+y \in E$

$\forall x \in D \; \forall y \in D:$

- 123456 composite: $\exists x, y \in \mathbb{Z}_{\geq 0},\ x, y \neq 1:$

$$123456 = x \cdot y$$

- Every even nr. is a multiple of 2:

$$\forall x \in E : \exists y \in \mathbb{Z} : \quad x = 2 \cdot y$$

$$\exists y \in \mathbb{Z} : \forall x \in E \ : \underline{x = 2 \cdot y}$$

<u>false:</u> suppose we have such a y:

Then $x = 2y$ must hold for every even x

In particular for $x = 4$ and for $x = 6$

$\underline{4} = 2y = \underline{6}$. So $4 = 6$ contradiction