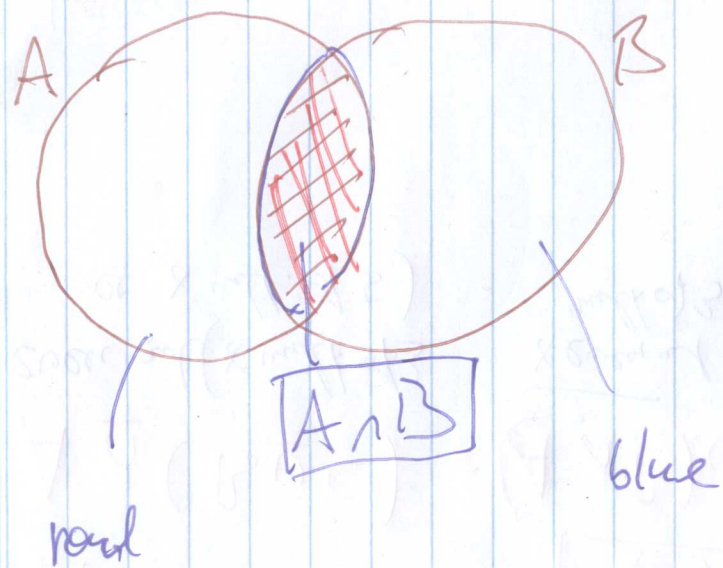




$$A \cap B \cap A = (A \cap B) \cap A$$

$$= \{x \mid x \in A \cap B, \text{ and } x \in A\}$$

$$= \{x \mid x \in A \text{ and } x \in B \text{ and } x \in A\}$$

Hasse Diagram

$$U = \{1, 2, 3, 4, 5\}$$

$$A = \{1, 2, 3\}$$

$$B = \{2, 3, 4\}$$

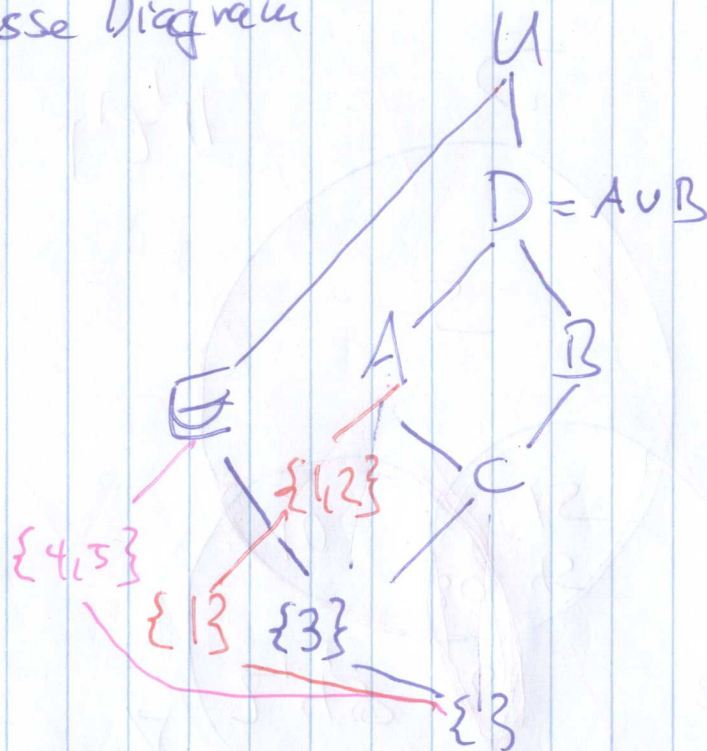
$$C = A \cap B = \{2, 3\}$$

$$D = \{1, 2, 3, 4\}$$

$$E = \{3, 4, 5\}$$

$$A \setminus B = \{1\}$$

$$D \setminus E = \{1, 2\}$$



Complement $A^c = U \setminus A$
 $= \{4, 5\}$

$$A = \{x \in \mathbb{Z}_+ \mid x \text{ even}\}$$

$$A^c = \{x \in \mathbb{Z}_+ \mid x \text{ odd}\}$$

$$B = \{x \in \mathbb{Z}_+ \mid x \text{ multiple of } 3\}$$

$$B^c = \{x \in \mathbb{Z}_+ \mid x \text{ not mult. of } 3\}$$

$$C = \{x \in \mathbb{Z}_+ \mid x \text{ mult. of } 5\}$$

$$C^c = \{x \in \mathbb{Z}_+ \mid x \text{ not mult. of } 5\}$$

Distributive Law

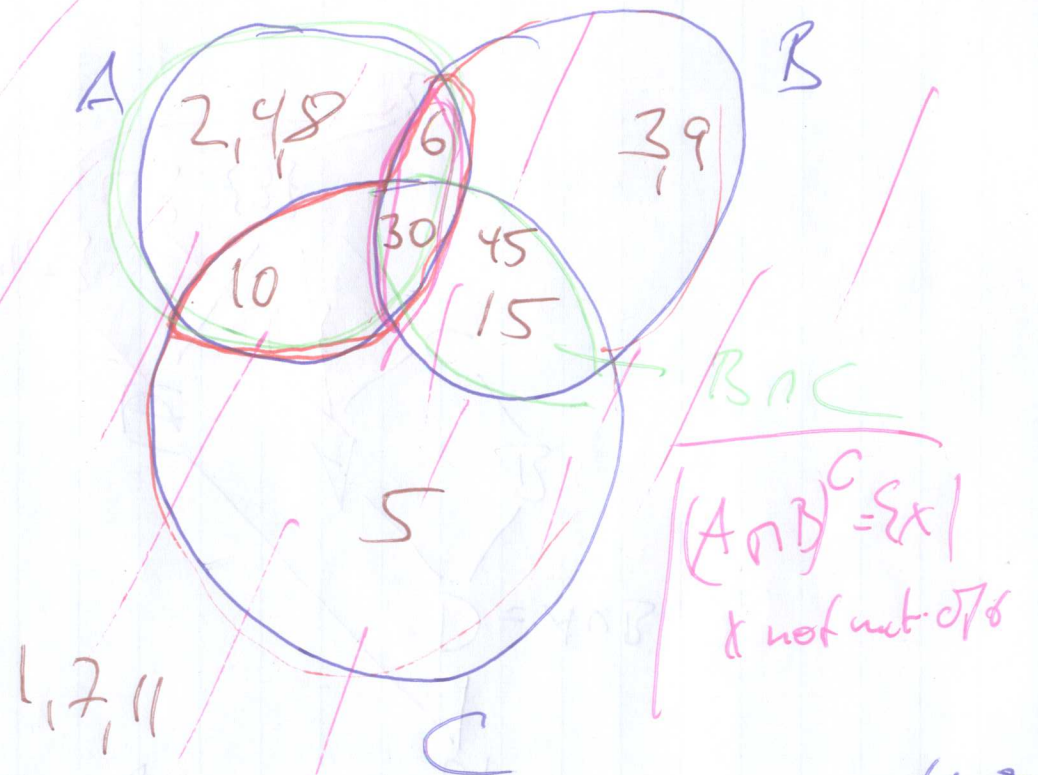
$$a \cdot (b \pm c) = (a \cdot b) \pm (a \cdot c)$$

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

x even and (x mult. of 3 or x mult. of 5)

x even and mult. of 3

x even and mult. of 5



a	b	c	a or b	a or c

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

↑
and
∧

↑
or
∨

"vel" Latin
"or"

$$a \cap (b \cup c) = (a \cap b) \cup (a \cap c)$$

b or c	a	b	c	a and b	a and c	a and (b or c)	(a and b) or (a and c)
T	T	T	T	T	T	T	T
T	T	F	T	F	T	T	T
T	T	T	F	T	F	T	T
T	T	F	F	F	F	F	F
F	T	T	T	T	T	T	T
F	T	T	F	T	F	T	T
F	T	F	T	F	T	T	T
F	T	F	F	F	F	F	F
F	F	T	T	F	T	T	T
F	F	T	F	F	F	F	F
F	F	F	T	F	T	T	T
F	F	F	F	F	F	F	F

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

$$a \cup (b \cap c) = (a \cup b) \cap (a \cup c)$$

A^c = everything not in A

De Morgan Law:

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

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

a	b	¬a	¬b	a ∨ b	a ∩ b	¬(a ∩ b)	¬a ∨ ¬b
T	T	F	F	T	T	F	F
T	F	F	T	T	F	T	T
F	T	T	F	T	F	T	T
F	F	T	T	F	F	T	T