

4.1 $A \cup B = \{-1, 0, 1, 2, 4\}$

$A \cap B = \{0\}$

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

$A \times B = \{\{-1, 0\}, \{-1, 2\}, \{-1, 4\}, \{0, 0\}, \{0, 2\}, \{0, 4\}, \{1, 0\}, \{1, 2\}, \{1, 4\}\}$

4.2 $\{x \in \mathbb{N} \mid x \leq 100\} \cap \{x \in \mathbb{N} \mid x = y^2 \text{ for some } y \in \mathbb{N}\} = \{0, 1, 8, 27, 64\}$

4.3

4.4 (a) 32

(b) $x \wedge y = 0000 \ 0000 \ 0000 \ 0000 \ 0000 \ 0000 \ 0000 \ 0000$
 $x \vee y = 1111 \ 1111 \ 1111 \ 1111 \ 1111 \ 1111 \ 1111 \ 1111$

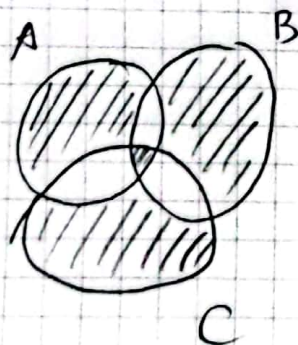
$\bar{x} = y$

(c)

(d) and or not

(e) logic gate

4.5



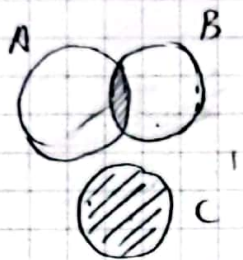
$$4.6 (a) (A \setminus B) \cap (B \setminus A)$$

$$(b) (A \Delta B) \cap C = ((A \setminus B) \cap (B \setminus A)) \cap C$$

$$(A \cap C) \Delta (B \cap C) = (A \cap C \setminus B \cap C) \cap (B \cap C \setminus A \cap C)$$

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

$$(c) (A \cap B) \Delta C$$



$$(A \Delta C) \cap (B \Delta C)$$

