

HW 2E: 9, 10

9.) $U = \mathbb{Z}$, $C = \{y \in \mathbb{Z} \mid -4 \leq y \leq -1\}$ and $D = \{y \in \mathbb{Z} \mid -7 \leq y < 0\}$

a.) $C = \{-4, -3, -2, -1\}$ $D = \{-7, -6, -5, -4, -3, -2, -1\}$

b.) $C \cap D = \{-4, -3, -2, -1\}$ c.) $C \cup D = \{-7, -6, -5, -4, -3, -2, -1\}$

d.) $n(C \cup D) = n(C) + n(D) - n(C \cap D)$

$$\Rightarrow 7 = 4 + 7 - 4$$

$$7 = 11 - 4$$

$$7 = 7 \checkmark$$

10.) $U = \{x \in \mathbb{Z}^+ \mid x < 31\}$

a.) $A = \{6, 12, 18, 24, 30\}$, $B = \{1, 2, 3, 5, 6, 10, 15, 30\}$
 $C = \{2, 3, 5, 7, 11, 13, 17, 19, 23, 29\}$

b.) i. $A \cap B = \{6, 30\}$ ii. $B \cap C = \{2, 3, 5\}$ iii. $A \cap C = \{\emptyset\}$
iv. $A \cap B \cap C = \{\emptyset\}$ v. $A \cup B \cup C = \{1, 2, 3, 5, 6, 7, 10, 11, 12, 13, 15, 17, 18, 19, 23, 24, 29, 30\}$

c.) $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$

$$\Rightarrow 18 = 5 + 8 + 10 - 2 - 3 - 0 + 0$$

$$18 = 23 - 5$$

$$18 = 18 \checkmark$$