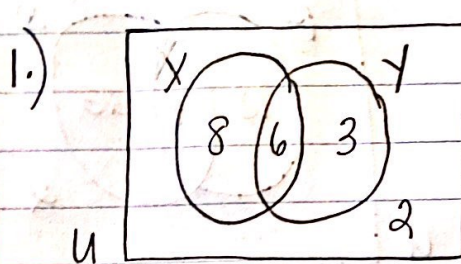
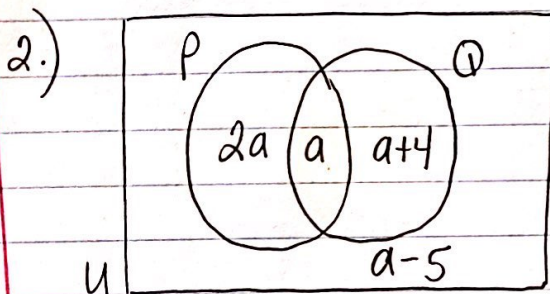


29 HW (HL): 1, 2, 5, 7



- 1.) a.) $X' = 3 + 2 = 5$ b.) $X \cap Y = 6$
 c.) $X \cup Y = 8 + 6 + 3 = 17$ d.) X , but not $Y = 8$
 e.) Y , but not $X = 3$ f.) neither X nor $Y = 2$



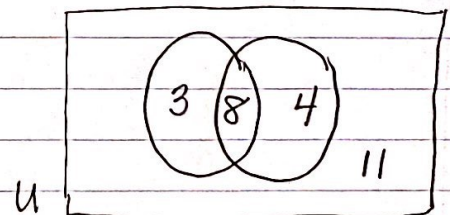
- 2.) a.) i. $n(P \cap Q) = a$ ii. $n(P) = 2a + a = 3a$
 iii. $n(Q) = a + a + 4 = 2a + 4$
 iv. $n(P \cup Q) = 2a + a + a + 4 = 4a + 4$
 v. $n(Q') = 2a + a - 5 = 3a - 5$
 vi. $n(U) = 2a + a + a + 4 + a - 5 = 5a - 1$

b.) i.) $n(U) = 29 \rightarrow 5a - 1 = 29$ ii.) $n(U) = 31 = 5a - 1$
 $5a = 30$ $32 = 5a$
 $a = 6$ $a = 32/5 = 6.5$

a must be a \mathbb{N} because it is impossible to have a partial element in a set. Therefore, there cannot be 31 elements in the universal set.

5.) $n(U) = 26$, $n(A) = 11$, $n(B) = 12$, $n(A \cap B) = 8$

a.) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
 $= 11 + 12 - 8$
 $= 15$



b.) $n(B, \text{ but not } A) = n(B) - n(A \cap B)$
 $= 12 - 8$
 $= 4$

7.) $n(U) = 50$, $n(S) = 30$, $n(R) = 25$, $n(R \cup S) = 48$

a.) $n(R \cap S) \rightarrow$ If $n(R \cup S) = n(R) + n(S) - n(R \cap S)$
 then $48 = 25 + 30 - n(R \cap S)$
 $48 = 55 - n(R \cap S)$
 $-7 = -n(R \cap S)$
 $\therefore n(R \cap S) = 7$

$$\begin{aligned} \text{b.) } n(S, \text{ but not } R) &= n(S) - n(R \cap S) \\ &= 30 - 7 \\ &= \boxed{23} \end{aligned}$$

