

Homework 3 Key

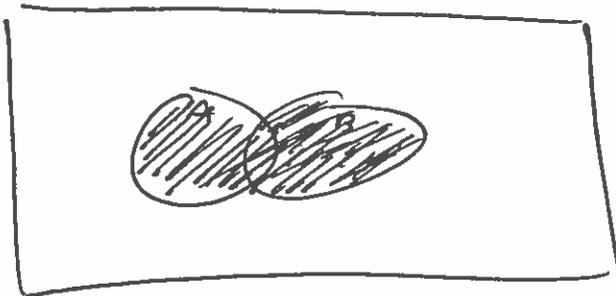
2.1 (7, 11-22, 27-30, ~~44-47~~, 52)

12) ~~A ∪ B~~ $A \cup B = \{ \text{Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday} \}$

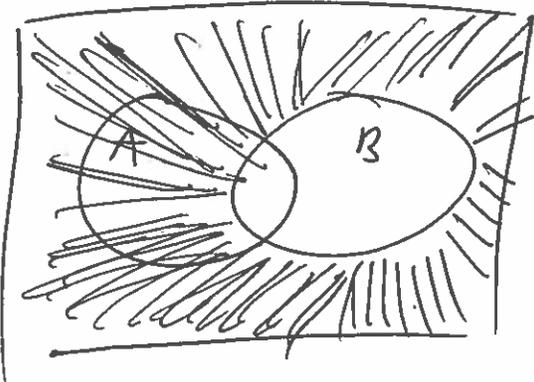
14) $A' = \{ \text{Saturday, Sunday} \}$

16) $A \cap (B') = \{ \text{Monday, Tuesday, Wednesday, Thursday} \}$

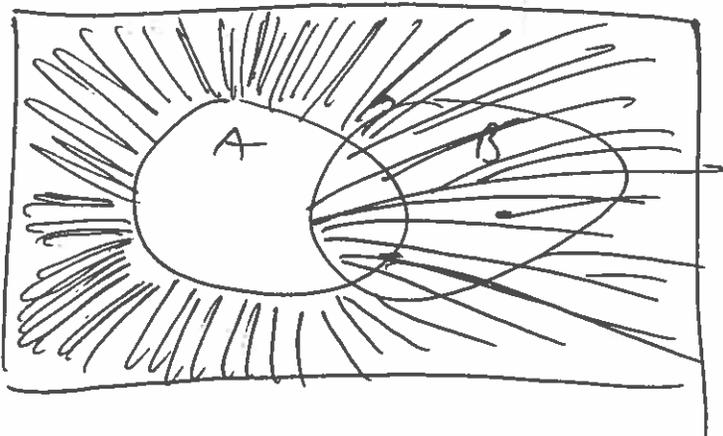
18)



20)



22)



28a) x must be less than or equal to z because A is a subset of $A \cup B$. $A \cup B$ has at least as many elements as A because everything in A is also in $A \cup B$

b) $w \geq z$

$w > y$

$y \leq z$

$x < w$

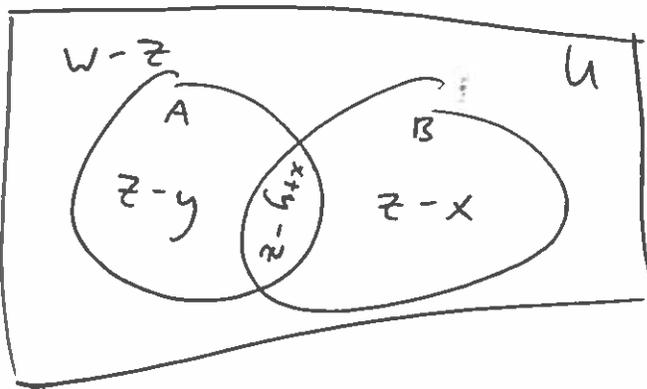
c) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$z = x + y - n(A \cap B)$

$z + n(A \cap B) = x + y$

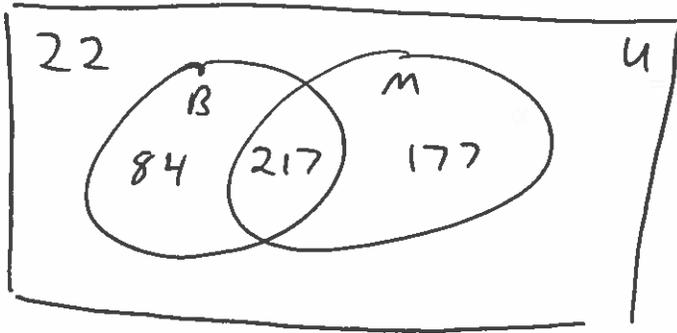
$n(A \cap B) = x + y - z$

The Venn Diagram is then



$$30a) \quad B = \{x \mid x \text{ owns a Blu-ray player}\}$$

$$M = \{x \mid x \text{ owns a microwave oven}\}$$



$$b) \quad n(B \cup M) = 84 + 217 + 177 = 478$$

$\frac{478}{500} = .956 \rightarrow 96\%$ of couples who took the survey own a Blu-ray player or microwave

$$44) \quad F = \{x \mid x \text{ is a face card}\}$$

$$D = \{x \mid x \text{ is a diamond}\}$$

$$n(F \cup D) = n(F) + n(D) - n(F \cap D)$$

$$= 12 + 13 - 3 = 22 \text{ face cards or diamonds}$$

$$46) \quad n(F \cap D) = 3 \text{ face cards and diamonds}$$

52a) If $A \subset B$, then $A \cap B = A$.

For an example, let $U = \mathbb{R}$, $A = \{0, 1\}$,

$$B = \{0, 1, 2\}$$

Then we see that $A \subset B$ and

$$A \cap B = \{0, 1\} = A$$

b) If $A \subset B$, then $A \cup B = B$

Use the same example as above and we

see that $A \cup B = \{0, 1, 2\} = B$