

Homework 3 Key

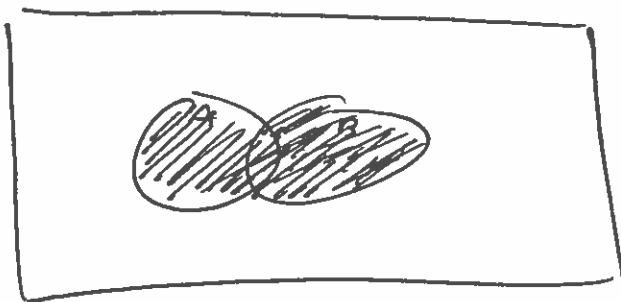
2.1 (7, 11-22, 27-30, ~~44~~-47, 52)

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

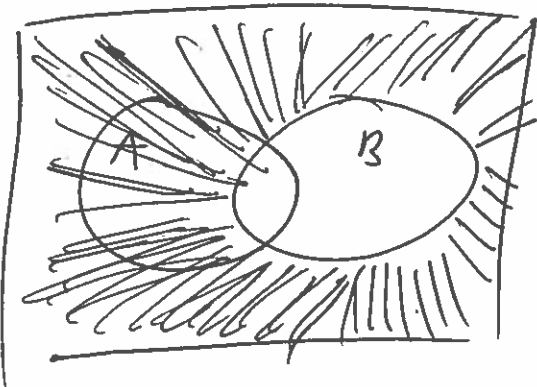
14) $A' = \{\text{Saturday, Sunday}\}$

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

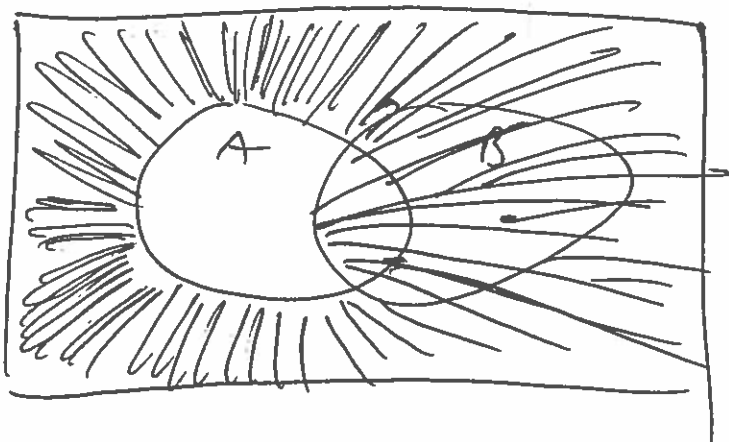
18)



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) $w \geq z$

$$w > y$$

$$y \leq z$$

$$x < w$$

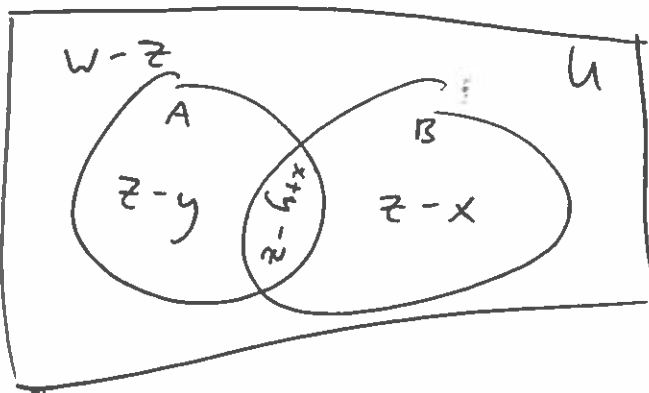
c) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

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

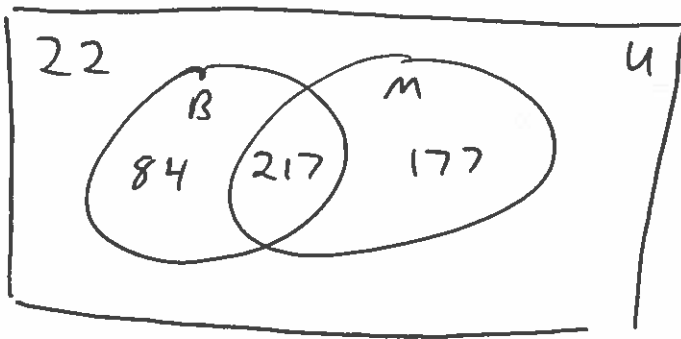
$$z + n(A \cap B) = x + y$$

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

The Venn Diagram is then



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



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

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

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

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

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

$= 12 + 13 - 3 = 22$ face cards or diamonds

46) $n(F \cap D) = 3$ 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 $A \cup B = \{0, 1, 2\} = B$