M118
FALL 2009

QUIZ 1

NAME _____

1) a) (15 PTS.) Returning from a trip, 200 people are processed through immigration. During their trip, 132 of these people visited Mexico, and 140 of them visited Guatemala. Every one of the two hundred people visited Mexico and/or Guatemala on their trip. How many visited both countries?

Mathematical Restatement: $n(U) = 200$, $n(M) = 132$, $n(G) = 140$, $M \cup G = U$.

$n(M \cup G) = n(M) + n(G) - n(M \cap G)$

$200 = 132 + 140 - n(M \cap G)$

$\Rightarrow \quad n(M \cap G) = 132 + 140 - 200 = 72$

Your answer here: $n(M \cap G) = n(Both) =$ 72

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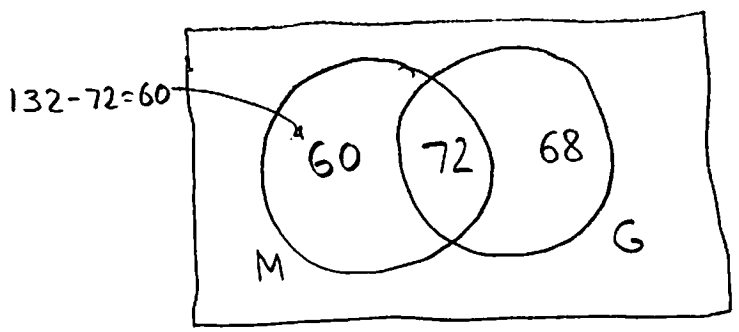
b) (10 PTS.) How many of these 200 people visited exactly one but NOT both of these countries. It will be helpful to draw a Venn diagram if you haven't already.



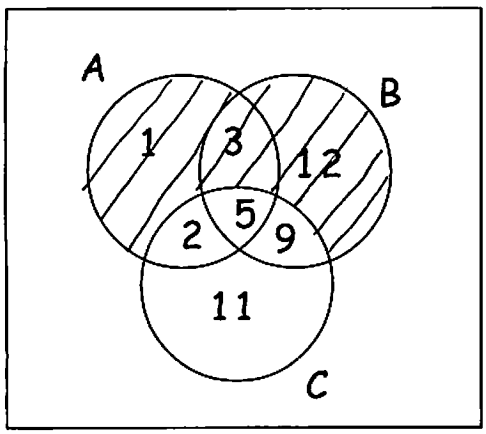
$140 - 72 = 68$

$60 + 68 = 128$

Your answer here: $n(One\ but\ NOT\ Both) =$ 128

SEE OTHER SIDE

2) a) (15 PTS.) In the Venn diagram below, how many elements are in $C' \cap (A \cup B)$.



$1+3+12 = 16$

Your answer here: $n(C' \cap (A \cup B)) =$ 16

b) (10 PTS.) Suppose U is a universal set with $n(U) = 100$. Suppose sets A, B, C are subsets of U with $n(A) = 40$, $n(B) = 50$, $n(C) = 40$, $n(A \cap C) = 25$, $n(B \cap C) = 30$, $n(A \cap B) = 25$, and $n(A \cap B \cap C) = 20$. Find $n(A \cup B \cup C)$.
Hint:

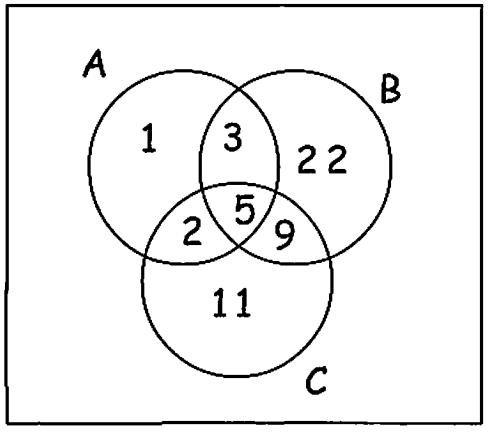
$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(A \cap C) - n(B \cap C) + n(A \cap B \cap C)$$

$= 40 + 50 + 40 - 25 - 25 - 30 + 20$

$= 70$

Your answer here: $n(A \cup B \cup C) =$ 70

2) a) (15 PTS.) In the Venn diagram below, how many elements are in $C' \cap (A \cup B)$.



1+3+22=26

Your answer here: $n(C' \cap (A \cup B)) =$ 26

b) (10 PTS.) Suppose U is a universal set with $n(U) = 100$. Suppose sets A, B, C are subsets of U with $n(A) = 40$, $n(B) = 50$, $n(C) = 40$, $n(A \cap C) = 25$, $n(B \cap C) = 30$, $n(A \cap B) = 25$, and $n(A \cap B \cap C) = 20$. Find $n(A \cup B \cup C)$.
Hint:

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

Your answer here: $n(A \cup B \cup C) =$ _____