

# QUIZ 1

NAME \_\_\_\_\_

**DUE:** Friday, September 8, at the beginning of class.

- 1) a) (10 PTS.) Suppose  $A$  and  $B$  are subsets of a universal set  $\Omega$  and that  $n(\Omega) = 132$ ,  $n(A) = 30$ ,  $n(B) = 22$  and  $n((A \cup B)') = 90$ . Find  $n(A \cap B)$ .

$$\begin{aligned} n((A \cup B)') &= 90 = n(\Omega) - n(A \cup B) \\ &= 132 - n(A \cup B) \end{aligned}$$

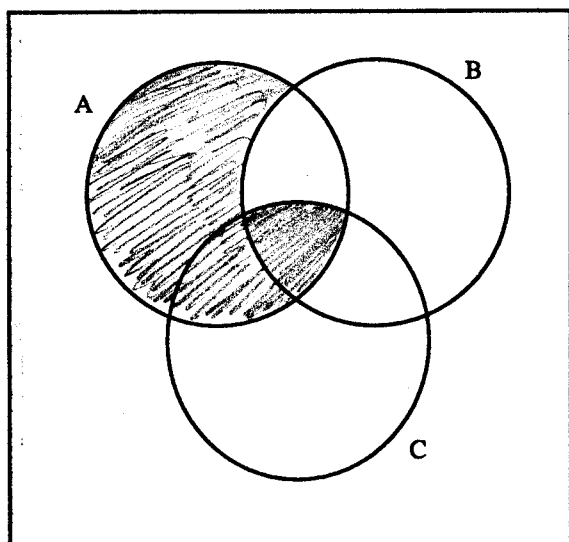
$$\Rightarrow n(A \cup B) = 42$$

$$\begin{aligned} n(A \cup B) &= n(A) + n(B) - n(A \cap B) \\ 42 &= 30 + 22 - n(A \cap B) \end{aligned}$$

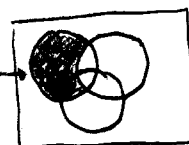
$$\Rightarrow 42 = 52 - n(A \cap B) \Rightarrow n(A \cap B) = 10$$

Your answer here:  $n(A \cap B) = \underline{10}$

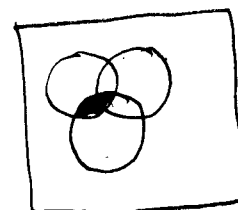
- b) (15 PTS.) In the Venn diagram below, shade in the region corresponding to  $(A' \cup B')' \cup (C \cap A)$ .



$$(A' \cup B')' = A \cap B$$



$$C \cap A$$



Paste these together  
since the problem calls for the union of



- 2) (25 PTS.) A survey of the 400 members of a garden club showed that 135 have planted marigolds, 85 have planted tulips, 130 have planted roses, 60 have planted marigolds and tulips, 80 have planted marigolds and roses, 60 have planted tulips and roses, and 205 have not planted any of the three (no marigolds, no roses, no tulips). How many have planted all three kinds of flowers?

$$1) \quad n(MUTUR) = n(M) + n(T) + n(R) - n(M \cap T) - n(T \cap R) - n(M \cap R) + n(M \cap T \cap R)$$
$$195 \qquad = 135 + 85 + 130 - 60 - 60 - 80 + ?$$

$$2) \quad n(MUTUR) = 400 - n(MUTUR)' = 400 - 205 = \underline{\underline{195}}$$

From 1) above,

$$195 = 150 + ?$$

$$\Rightarrow ? = 45$$

Your answer here: # that have planted all three = 45