MATH 110 - EXAM 1 - SOLUTIONS

1. (a) $\underline{X} = D' \cap S$

(b) $S' \cap (A \cup D) = \{$Applicants who have not received a speeding ticket but who have either caused an accident or been arrested for drunk driving.$\}$

2. $n(S \cup T) = n(S) + n(T) - n(S \cap T)$

$25 = 18 + 10 - n(S \cap T)$

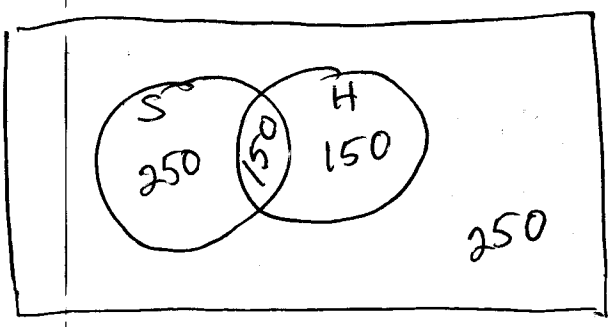
$25 = 28 - n(S \cap T)$

$n(S \cap T) = 3$ //

3. $S = \{$students who ski$\}$

$H = \{$students who play hockey$\}$

(a)



(b) $250 + 150 + 150 = 550$ students in $S \cup H$.

4. There are 4 choices for each of 5 questions so by Multiplication Principle there are

$$4^5 = 1024 \text{ ways to do the quiz}$$

5. In this case the order of the choice matters so there are $P(20,3) = 20 \cdot 19 \cdot 18 = 6840$ // ways to choose the board of directors.

6. Making a word consists of choosing the 7 positions out of 12 for the A's and filling the remaining positions with B's (or equivalently choosing the 5 positions out of 12 for the B's and filling the remaining positions with A's). There are

$$\binom{12}{7} = \binom{12}{5} = \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8}{5 \cdot 4 \cdot 3 \cdot 2} = 792 //$$

ways to do this.