

Homework 4 Key

2.2 (1, 2, 27-30)

2.3 (1-4, 17, 18, 41-44)

Section 2.2

2a) $U = \{x \mid x \text{ belongs to a union}\}$

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

$N = \{x \mid x \text{ took the survey}\}$ (i.e. N is the universe)

$$n(N) = 300$$

$$n(U) = 231$$

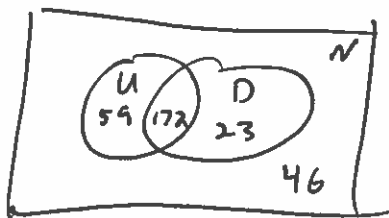
$$n(D) = 195$$

$$n(D \cap U) = 172$$

The number of people who either belong to a union or are Democrats is

$$\begin{aligned} n(U \cup D) &= n(U) + n(D) - n(U \cap D) = 231 + 195 - 172 \\ &= 254 \end{aligned}$$

b) Setting up the Venn Diagram gives



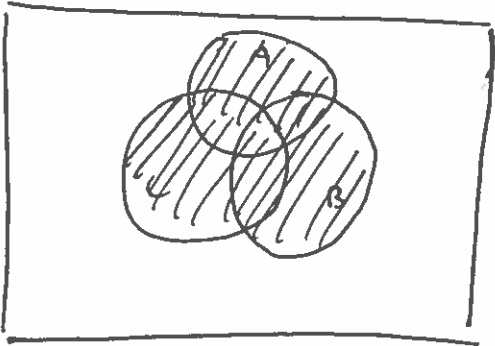
so the number of ~~Democrat~~
union workers who aren't Democrats is 59

2c) The number of workers who belonged to the Democrats but were not union members is 23.

d) ~~Those who belonged neither to a union nor the Democrats~~

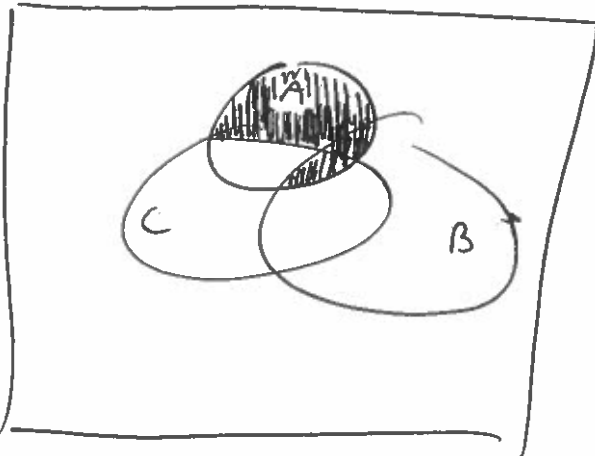
There are 46 workers who neither belong to the union nor were Democrats

28)



$$A \cup B \cup C$$

30)

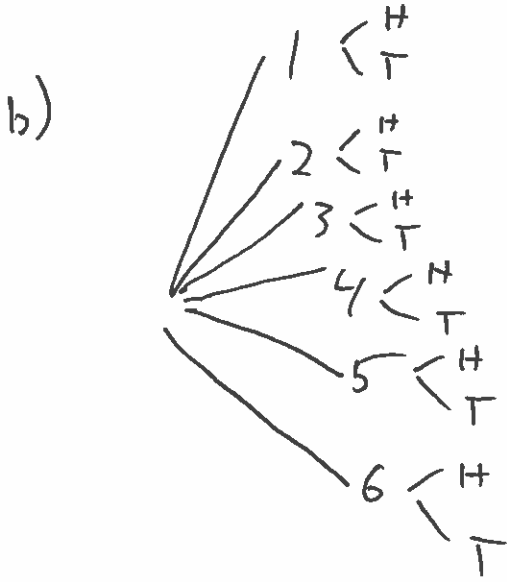


$$A \cap (B \cup C)$$

Section 2.3

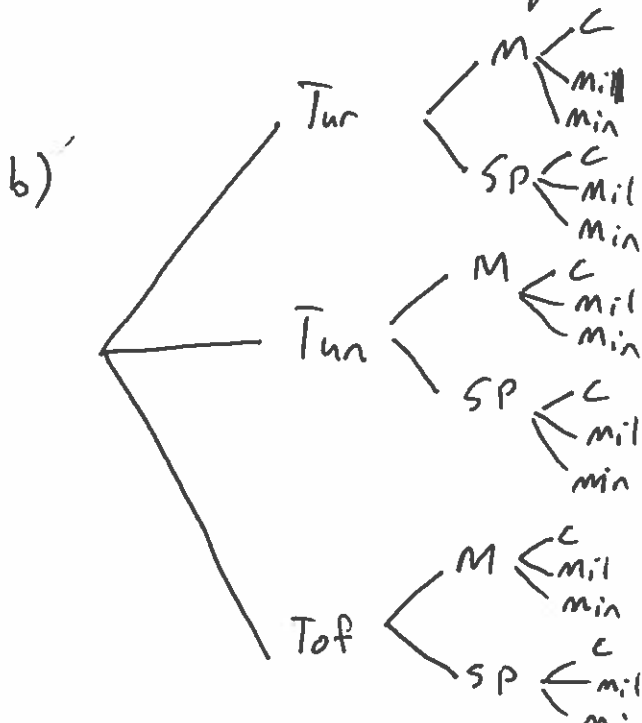
2a) 6 2
die coin

→ there are $6 \cdot 2 = 12$ possible outcomes



4a) 3 2 3
sandwich soup ~~beverage~~

→ there are $3 \cdot 2 \cdot 3 = 18$ possible lunches



$$18) \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10} \quad \underline{10}$$

→ there are $10^{16} = 10,000,000,000,000,000$
possible credit card numbers

$$42) \quad \frac{n!}{(n-r)!} = \frac{n!}{(n-n)!} = \frac{n!}{0!} = \frac{n!}{1} = n!$$

$$44) \quad \frac{7!}{(7-4)! \cdot 4!} = \frac{7!}{3! \cdot 4!} = 35$$