1. a not mutually exclusive $P(A \cap B) = 0.25$
b. is mutually exclusive
c not mutually exclusive $P(A \cap B) = \left(\frac{2}{36}\right)$

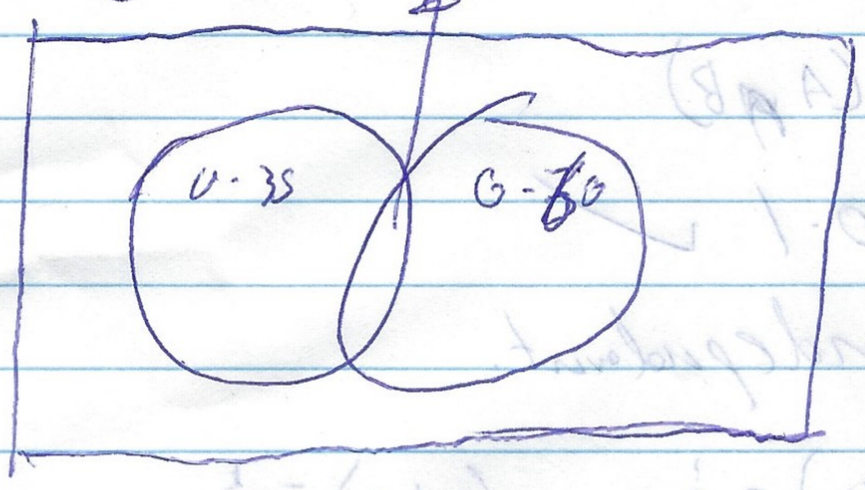
2. $C = 60\%$.
$F = 35\%$ $\overline{C+F} = 15\%$

a. $60\% * 35\% = 0.21$
$P(A) + P(B) - P(A \cap B)$
$0.60 + 0.35 - 0.21 = 0.74 \rightarrow$
$P(0.74) + P(0.21) - P(0.74 * 0.21)$
$0.95 - 0.1554 = \underline{0.7946}$

b = $\underline{0.21}$

c. $P(F \cap \overline{C}) = 0.35 * 0.40 = 0.14$

d. to $P(F \cup \overline{C}) =$ $= P(A) + P(B) - 2P(A \cap B)$
$.60 + .35 - 2(0.21)$
$= 0.95 - 0.42$
$= 0.53$

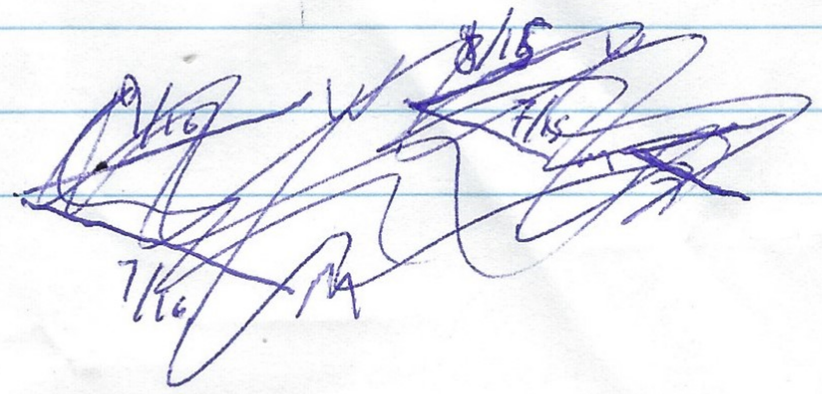


3. a. $\frac{26}{52} = P(\text{black})$

$P(\text{black and not Queen}) = \frac{28}{52}$

4 a. ${}^{16}C_5 = \binom{16}{5} = \frac{16!}{5!(16-5)!} =$ 4368 distinct combinations

b ${}^{16}C_5 = \frac{11!}{5} = \frac{16!}{(16-5)!5!} =$



${}^{16}C_5 = \binom{16}{5} = \frac{16!}{11!} = 524160$ $\frac{71}{524160}$

$35 + 36 = 71$

${}^{9}C_2 = \binom{9}{2} = \frac{9!}{(9-2)!2!} = 36$ ${}^{7}C_3 = \binom{7}{3} = \frac{7!}{(7-3)!3!} = 35$

$P(A \cap B) = P(A)P(B)$

5. a∩b. $P(A|B) = \frac{P(A \cap B)}{P(B)}$

~~$P(B) = P(D)$~~ $P(B) = P(D)$

~~$P(A) = P$~~

~~$P(D) = P(C) =$~~

$P(D) = 0.5$

$P(C) = \frac{1}{3}$ / 0.5

$P(C|D) = \frac{2}{3}$

$P(C \cap D) = \frac{1}{3}$

$P(D) = \frac{P(C \cap D)}{P(C|D)}$

$0.5 = \frac{\frac{1}{3}}{\frac{2}{3}}$

$P(D) = 0.5$

$P(C) = \frac{2}{3}$

6. $P(A) = \frac{2}{5}$ $P(A \cup B) = \frac{11}{20} = 0.55$

$P(B) = \frac{1}{4}$

$P(A) + P(B) = 0.65$

a. $P(a)$ and $P(B)$ are not mutually exclusive as for above, $0.65 \neq 0.55$ and $0.55 = P(A \cup B)$

b. $\frac{2}{5} \times \frac{1}{4} = 0.1$

$P(a \cup b) = P(A) + P(B) - P(A \cap B)$

$0.55 = 0.65 - 0.1$ ✓

events are ~~indep~~ independent.

7. $P(C \cap D) = \frac{1}{4}$ $P(C|D) = \frac{1}{3}$ $P(D|C) = \frac{3}{5}$

a. $P(C) = \frac{\frac{1}{4}}{\frac{3}{5}} = 0.416666... = \frac{5}{12}$

b. $P(D) = \frac{\frac{1}{4}}{\frac{1}{3}} = \frac{0.75}{\frac{3}{4}}$

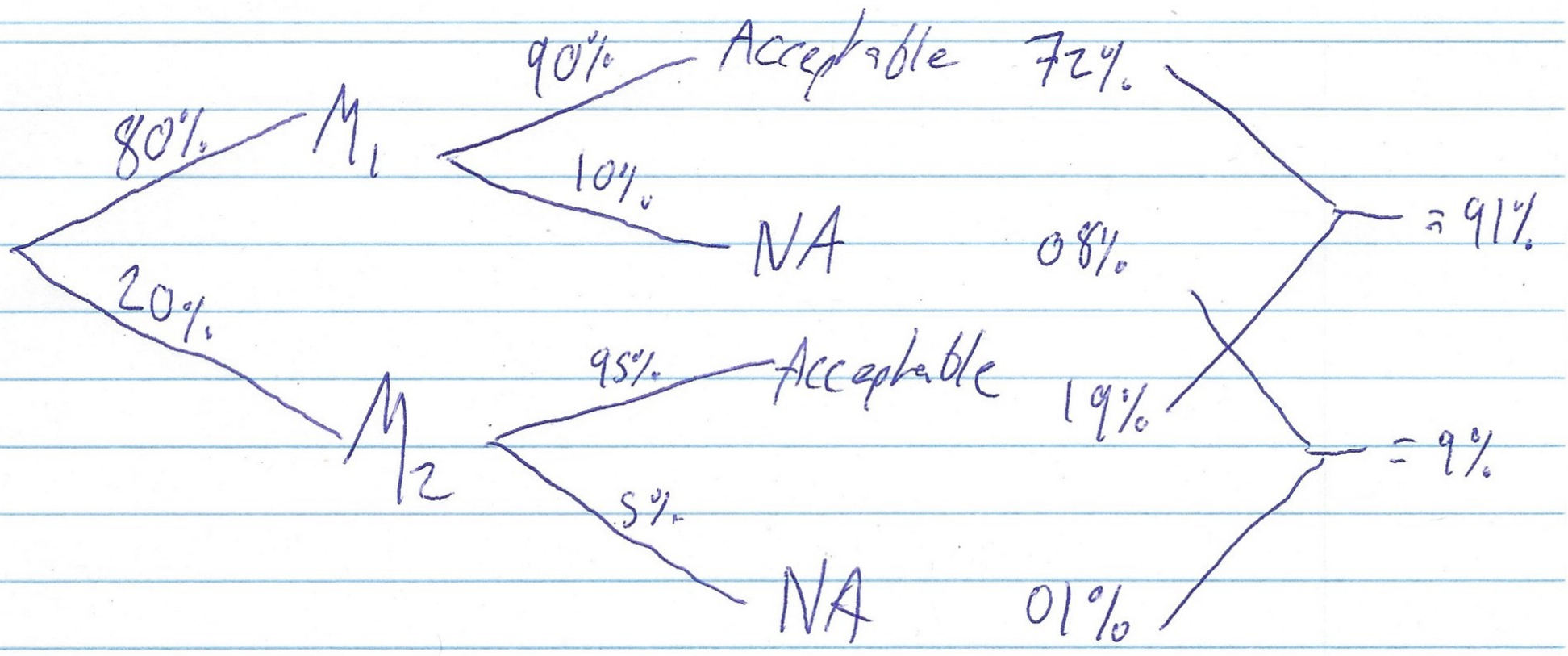
c. $P(C|\bar{D})$

$\bar{D} = 0.25 = \frac{1}{4}$

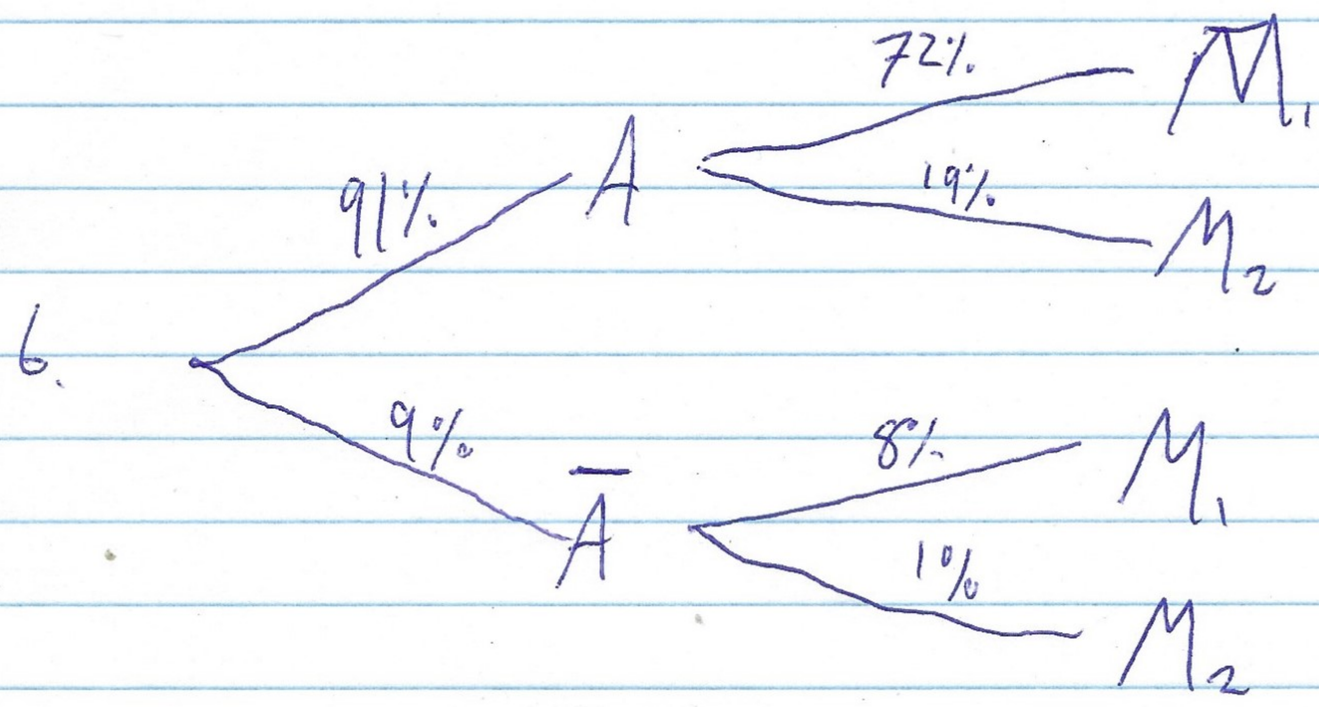
$P(C|\bar{D}) = \frac{P(C \cap \bar{D})}{P(\bar{D})} = \frac{(\frac{5}{12} \times \frac{3}{4})}{0.25} = \frac{\frac{5}{16}}{\frac{1}{4}} = C = \frac{5}{16}$

8.

a.



6.



C. I. $p(m_1 | \bar{A}) = \frac{8}{9} \approx 88.88\%$

II $p(m_2 | A) = \frac{19}{91} \approx 20.88\%$