HW2

Problems: ~~2.6~~, ~~.14~~, ~~.16~~, ~~.22~~, ~~.28~~, ~~.32~~, ~~.54~~, ~~.64~~, ~~.72~~, .78, .80, .100, .124

2.6. S is $\{A_1A_2, A_1A_3, A_1A_4, A_2A_3, A_2A_4, A_3A_4\}$

2.14. (a) $A \cup C$ is $\{0, 2, 3, 4, 5, 6, 8\}$

(b) $A \cap B$ is $\emptyset$

(c) C' is $\{0, 1, 6, 7, 8, 9\}$

(d) $(C' \cap D) \cup B$ is $\{1, 3, 5, 6, 7, 9\}$

(e) $(S \cap C)'$ is $\{0, 1, 6, 7, 8, 9\}$

(f) $A \cap C \cap D'$ is $\{2, 4\}$

2.16 (a) $M \cup N$ is $\{x \mid 0 < x < 9\}$

(b) $M \cap N$ is $\{x \mid 1 < x < 5\}$

(c) $M' \cap N'$ is $(M \cup N)'$ is $\{x \mid 9 < x < 12\}$

2.22 8 blood types, 3 pressures $> 8 \cdot 3 = 24$ A patient can be classified in 24 ways.

2.28 5 manufacturers, 3 forms, 2 potencies $5 \cdot 3 \cdot 2 = 30$ A doctor can prescribe 30 combinations of the drug to a patient suffering from asthma

2.32 (a) $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 30 \cdot 12 \cdot 2 = 360 \cdot 2 = 720$

People can be lined up in 720 ways

(b) 3 people want to follow (group) combo $= 3!$ $= 4 \cdot 3^2 \cdot 2^2 = 4 \cdot 9 \cdot 4 = 144$

3 people remaining + 1 group of people combo $= 4!$

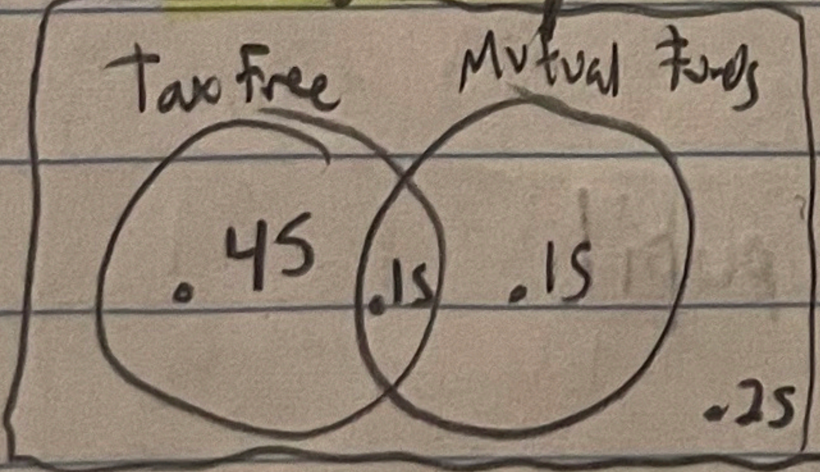
The people could be lined up to get on the bus in 144 ways

(c) 2 people together in a group of 6 in both orders $= 2 \cdot 5!$ ⇒ Negated ⇒ $6! - (5! \cdot 2)$

$30 \cdot 12 \cdot 2 - 20 \cdot 6 \cdot 2 = 60 \cdot 12 - 40 \cdot 6 = 480$

If 2 specific people refuse to follow each other, there are still 480 possible ways.

2.54



(a). A customer will invest in either of the two positions, but not both with a probability of .60

(b) A customer will invest in neither with a probability of .25.

2.64. $P(6000+) = .42$

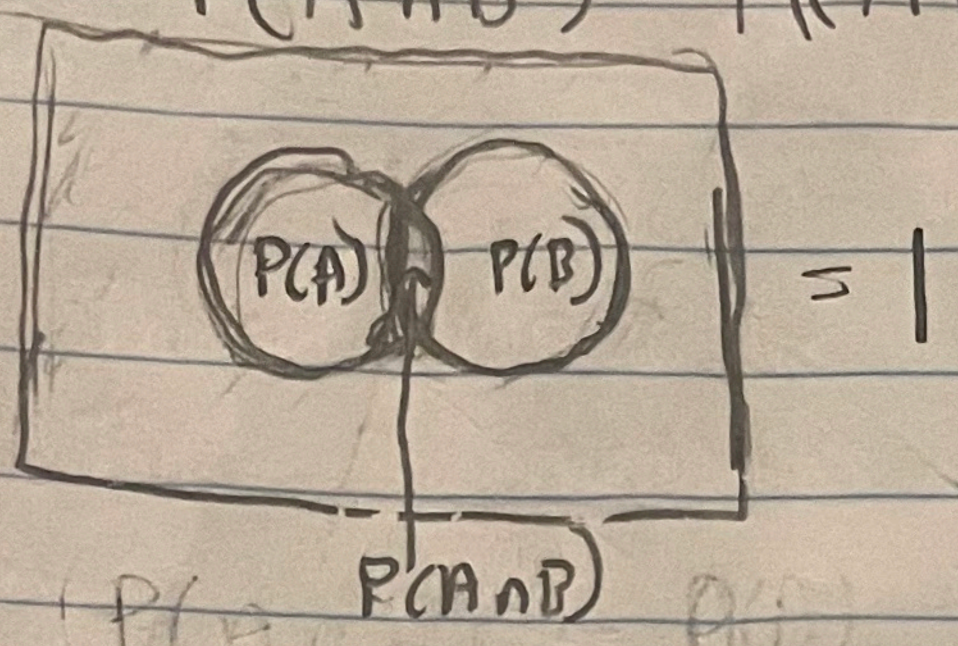
$P(-4000) = .04$

$P(4000-6000) = .56$

(a) The probability the component will survive less than or equal to 6000 hours is .6.

(b) A probability of .98 is expected for components lasting over 4k hours.

2.72 $P(A'\cap B') = P((A\cup B)')$

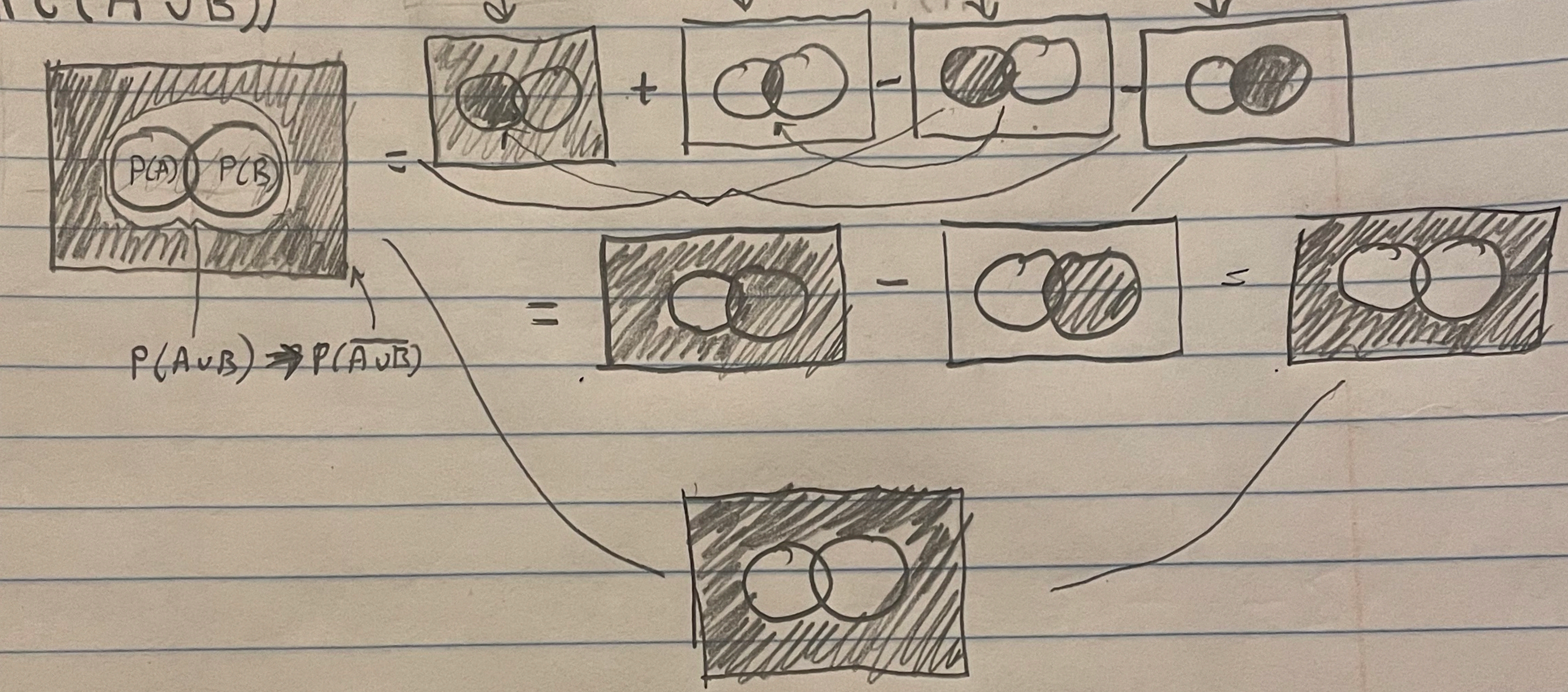


- corresponding proportion (shaded)

Using visuals, the proof is demonstrated below.

$P(A'\cap B') = 1 + P(A\cap B) - P(A) - P(B)$

$P((A\cup B))'$



.73