$\boxed{3C}$ #8 addition rule

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

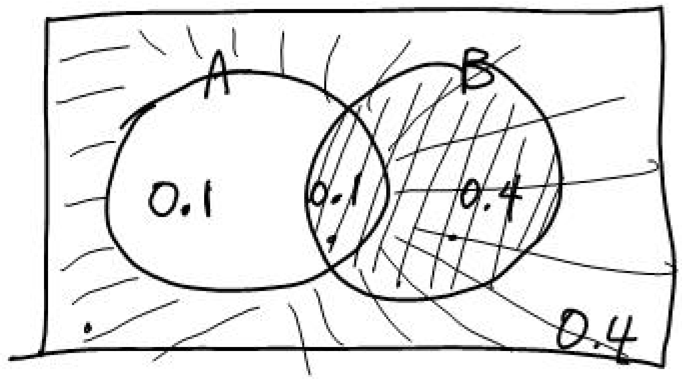
$= 0.2 + 0.5 - 0.1$

$= 0.6$

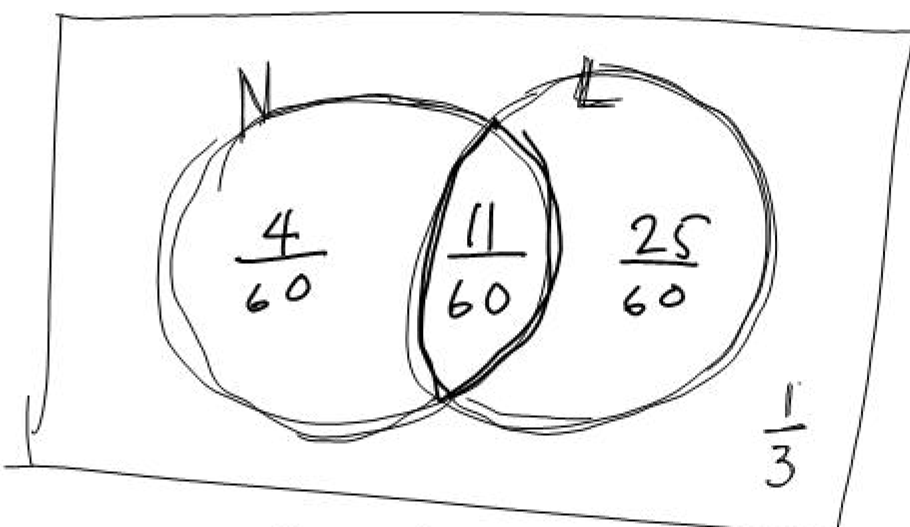
(b) $P(A \cup B)' = 1 - 0.6 = 0.4$

(c) $P(A' \cup B) = 0.9$

or



#6



$\frac{2}{3} = \frac{40}{60}$ $\quad \frac{1}{4} = \frac{15}{60}$

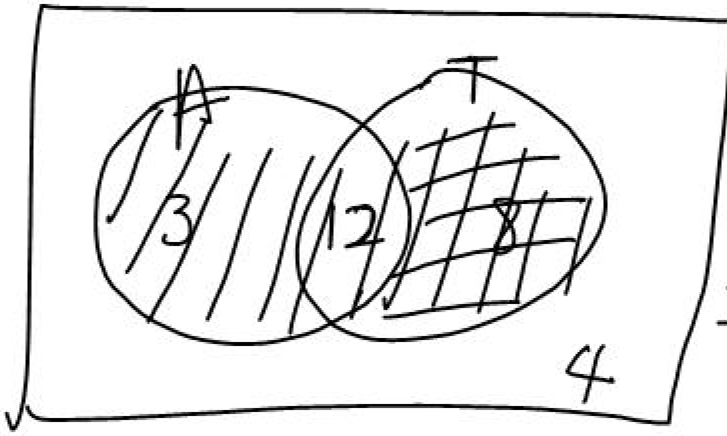
$\frac{3}{5} = \frac{36}{60}$

$\frac{1}{4} + \frac{3}{5} = \frac{17}{20}$

$= \frac{51}{60}$

$\frac{51}{60} - \frac{40}{60} = \frac{11}{60}$

3G #1

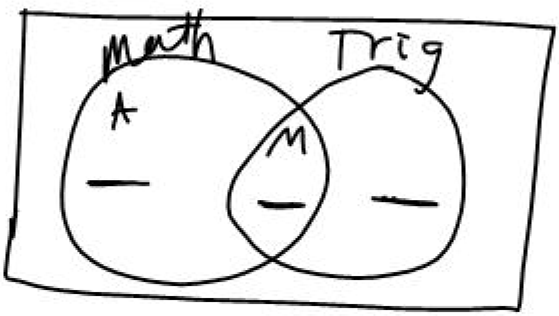


$$\begin{array}{r} 15 \\ 20 \\ \hline 35 \\ -23 \\ \hline 12 \end{array}$$

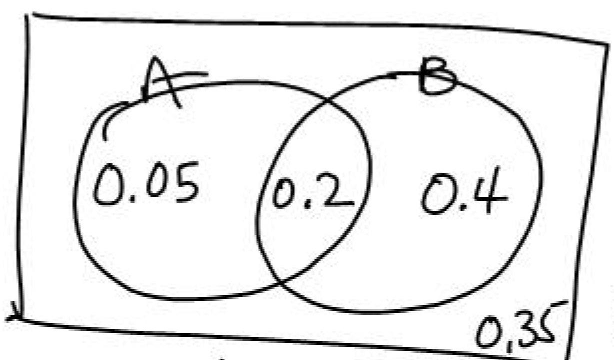
(a) $\frac{8}{27}$ (b) $P(T \cup A) = \frac{23}{27}$

(b) $P(T|A) = \dfrac{P(T \cap A)}{P(A)} = \dfrac{\frac{12}{\cancel{27}}}{\frac{15}{\cancel{27}}}$

$= \frac{4}{5}$



3G #2



(a) $P(A \cup B) = 0.65$

$$\begin{array}{r} 0.25 \\ 0.60 \\ \hline 0.85 \end{array}$$

$P(A|B) = \dfrac{P(A \cap B)}{P(B)} = \dfrac{0.2}{0.6} = \dfrac{1}{3}$

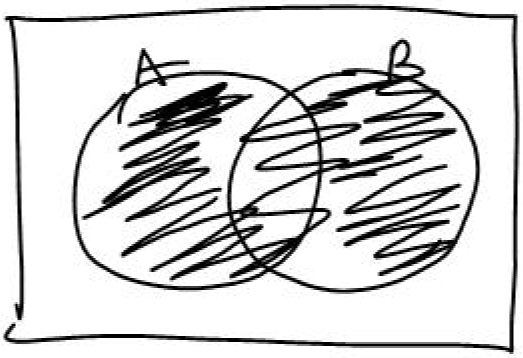
$P(B'|A') = \dfrac{P(B' \cap A')}{P(A')} = \dfrac{0.35}{0.75} = \dfrac{7}{15}$

$\boxed{3G}$ #5 $P(D) = 0.95$

$$P(L \cap D) = 0.61$$

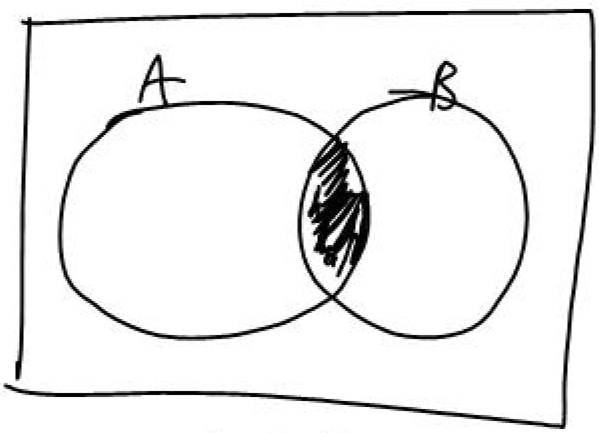
$$P(L|D) = \frac{P(L \cap D)}{P(D)} = \frac{0.61}{0.95}$$

$$= \frac{61}{95}$$



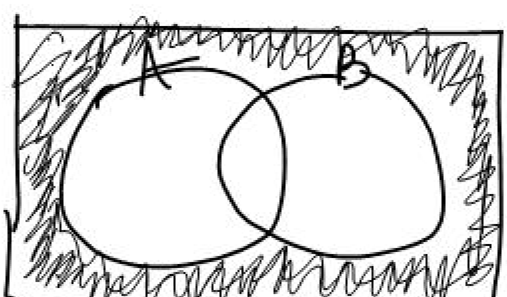
$A \cup B$

A or B

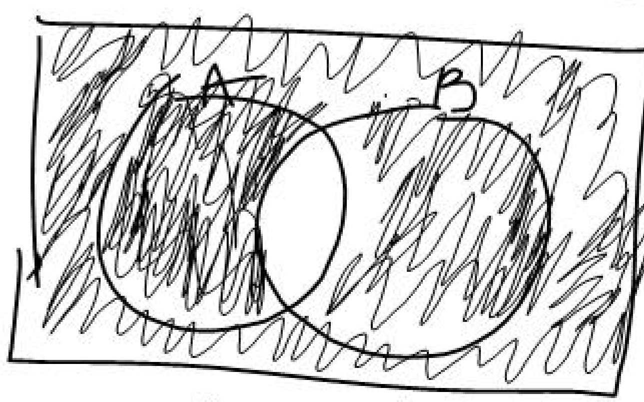


$A \cap B$

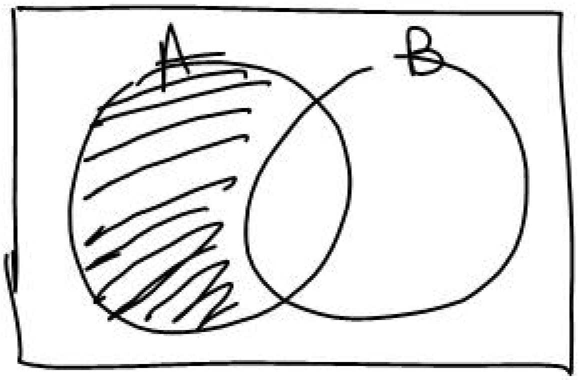
A and B



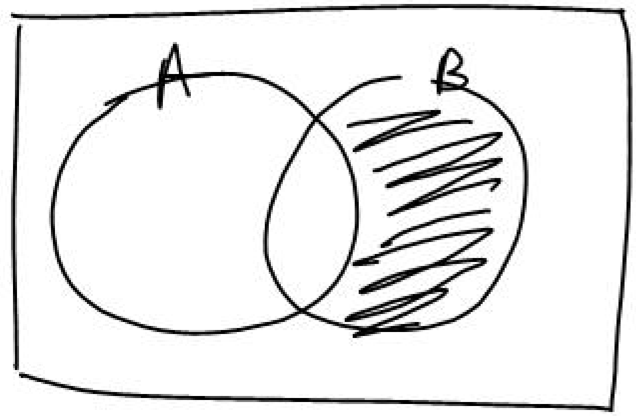
$A' \cap B'$



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



$A \cap B'$



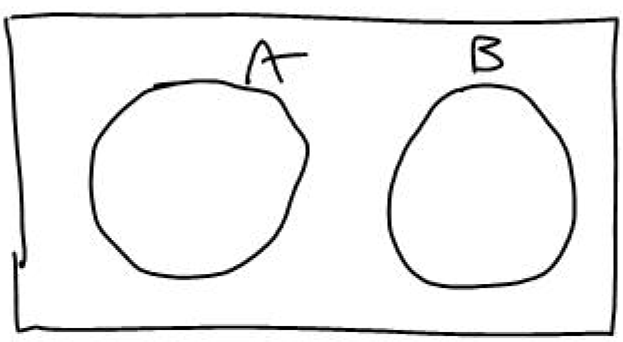
$A' \cap B$

Mutually Exclusive Events

these events cannot happen at the same time. Ex, Toss a coin.

A = heads
B = tails

these are mutually exclusive



$P(A \cap B) = 0$

Addition rule for M. E. events:

$$P(A \cup B) = P(A) + P(B) \cancel{- P(A \cap B)}$$

Ex. A box contains marble of different colors. $\frac{1}{4}$ of them are blue. $\frac{1}{5}$ of them are red. Find $P(R \cup B)'$.

$$P(R \cup B) = P(R) + P(B) \cancel{- P(R \cap B)}$$

$$= \frac{1}{5} + \frac{1}{4}$$

$$= \frac{9}{20}$$

$$P(R \cup B)' = 1 - \frac{9}{20} = \frac{11}{20}$$

Independent Events

If the occurance of 1 event does not change the probability of another event, then they are <u>independent events</u>.

EX. Draw 2 cards. (no replacement)

A = 1st card is red

B = 2nd card is red.

Are A and B independent? NO

Suppose A happens. $P(B|A) = \frac{25}{51}$

Suppose A doesn't happen.

$$P(B|A') = \frac{26}{51}$$

EX. Toss 2 coins.

A = 1st coin is H

B = 2nd coin is H

$$\left.\begin{aligned} P(B|A) &= \tfrac{1}{2} \\ P(B|A') &= \tfrac{1}{2} \end{aligned}\right\} \text{These are independent events.}$$

HW $\boxed{3C}$ #5

$\boxed{3D}$ #1-4

optional : quiz review