

$$A \cup B = A$$

$$A \cap B = B$$

$$\begin{array}{l} P(C|B) = \frac{1}{2} \\ P(B|C) = 1 \\ P(K|D) = \frac{1}{3} = P(K) \end{array} \quad \left( P(B|C) = \frac{1}{4} \right) \quad \begin{array}{l} P(B) = \frac{1}{2} \\ P(C) = \frac{1}{4} \\ P(K) = \frac{1}{3} \\ P(D) = \frac{1}{4} \end{array}$$
$$P(K|D) = \frac{1}{3} = P(K)$$
$$P(K \cap D) = \frac{1}{52}$$

## Independent Events (2 events)

The probability of one occurring does not depend on whether the other has occurred or not.

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

$$P(A) = P(A|B)$$

If  $A \cap B = \emptyset$  (or  $A \cap B = \{ \}$ )  
the  $P(A \cap B) = 0$

~~$\{ \emptyset \}$~~

K is king

F is face card

D is diamond

B is black

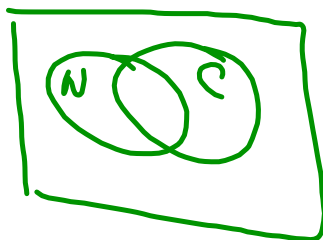
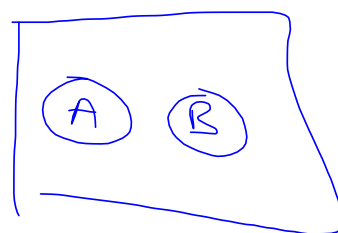
C is club

N is a numbered card

	indep.?	mut excl.?
C,N	Y	N
N,K	N	Y
B,N	Y	N
B,D	N	Y
K,F	N	N

A, B are mut excl

$$P(B|A) = 0$$



K, F

$$P(K|F) = \frac{1}{3} = \frac{\frac{4}{52}}{\frac{12}{52}} = \frac{P(K)}{P(F)}$$

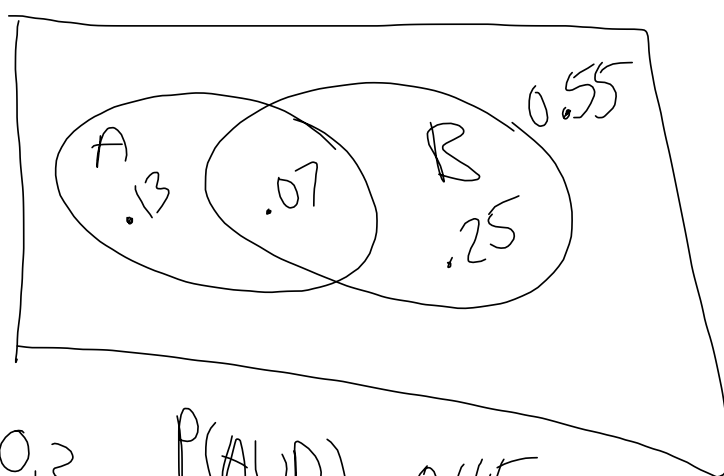
P(K), P(F)



$$P(N|C) = \frac{9}{13} = \frac{\frac{9}{52}}{\frac{13}{52}} = \frac{P(N \cap C)}{P(C)}$$

N is 2,3,4,...,10

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$



$$P(A|B) = \frac{.07}{.32}$$

$$P(A) = 0.2 \quad P(A \cup B) = 0.45$$

Indep events:  $P(A \cap B) = P(A)P(B)$

Not necessarily  
indep events

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

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

$\left. \begin{array}{l} 3R \\ 5Y \end{array} \right\}$  Draw 2 w/ replacement

$$P(YY) = \frac{5}{8} \cdot \frac{5}{8} = \frac{25}{64}$$

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2 w/o replacement

$$P(YY) = \frac{5}{8} \cdot \frac{4}{7} = \frac{20}{56}$$

