

3-6-19

COMPLIMENT PROBABILITY:

$$P(\text{NOT } A) = 1 - P(A)$$

$$\Rightarrow \text{EX. } P(\text{RAIN}) = 40\%$$

$$\hookrightarrow P(\text{NOT RAIN}) = 100\% - P(\text{RAIN})$$

- DISJOINT:  $P(A \text{ AND } B) = \emptyset$   
 $\hookrightarrow$  NOT GOING TO HAPPEN,  
CAN'T OCCUR @ SAME TIME

- EXPECTED VALUE (MEAN)  
 $\hookrightarrow$  CALCULATE THE WEIGHTED VALUE  
OF THE OCCURRENCES

$$\sum x \cdot P(x) = \mu_x \quad \begin{array}{l} \text{WEIGHTED} \\ \text{MEAN} \end{array} = \text{EXPECTED VALUE}$$

NOTE! DO NOT CONFUSE WITH  $\bar{x} = \text{MEAN}$   
OF A SAMPLE

- INDEPENDENT: NO ASSOCIATION

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

$\hookrightarrow$  NOT THE SAME AS DISJOINT

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# PROBABILITIES

$0 \leq P(x) \leq 1$   
 $\downarrow$  DEFINITELY WILL NOT HAPPEN       $\uparrow$  100% DEFINITELY WILL HAPPEN

• THEORETICAL PROBABILITY:  
 COIN FLIP  
 $P(\text{HEADS}) = \frac{1 \text{ HEADS}}{2 \text{ POSSIBLE HEADS/TAIL}} = 50\%$

$\rightarrow$  USUALLY BASED ON EQUALLY LIKELY OUTCOMES (A FAIR COIN)

$\rightarrow$  RELATIVE FREQUENCY

• EMPIRICAL PROBABILITY  $P(A) = \frac{\#A \text{ OCCURS}}{\# \text{ TRIALS}}$

$\rightarrow$  FLIP COIN MANY TIMES & SEE ACTUAL % HEADS

$\Rightarrow$  FLIP 100x & GET 52H/48T

$\rightarrow$  IF YOU KEEP FLIPPING THE COINS IT WILL GET CLOSER TO THE THEORETICAL, 50%

\* EXAMPLE: FREE THROWS (AN UNFAIR COIN, SKILL)  
 $P(\text{MAKE A FREE THROW}) = \frac{\# \text{ SHOTS MADE}}{\# \text{ SHOTS TAKEN}}$

REQUIRE SKILL

$\Rightarrow P(A)$  IS MORE ACCURATE AS # TRIALS INCREASE.