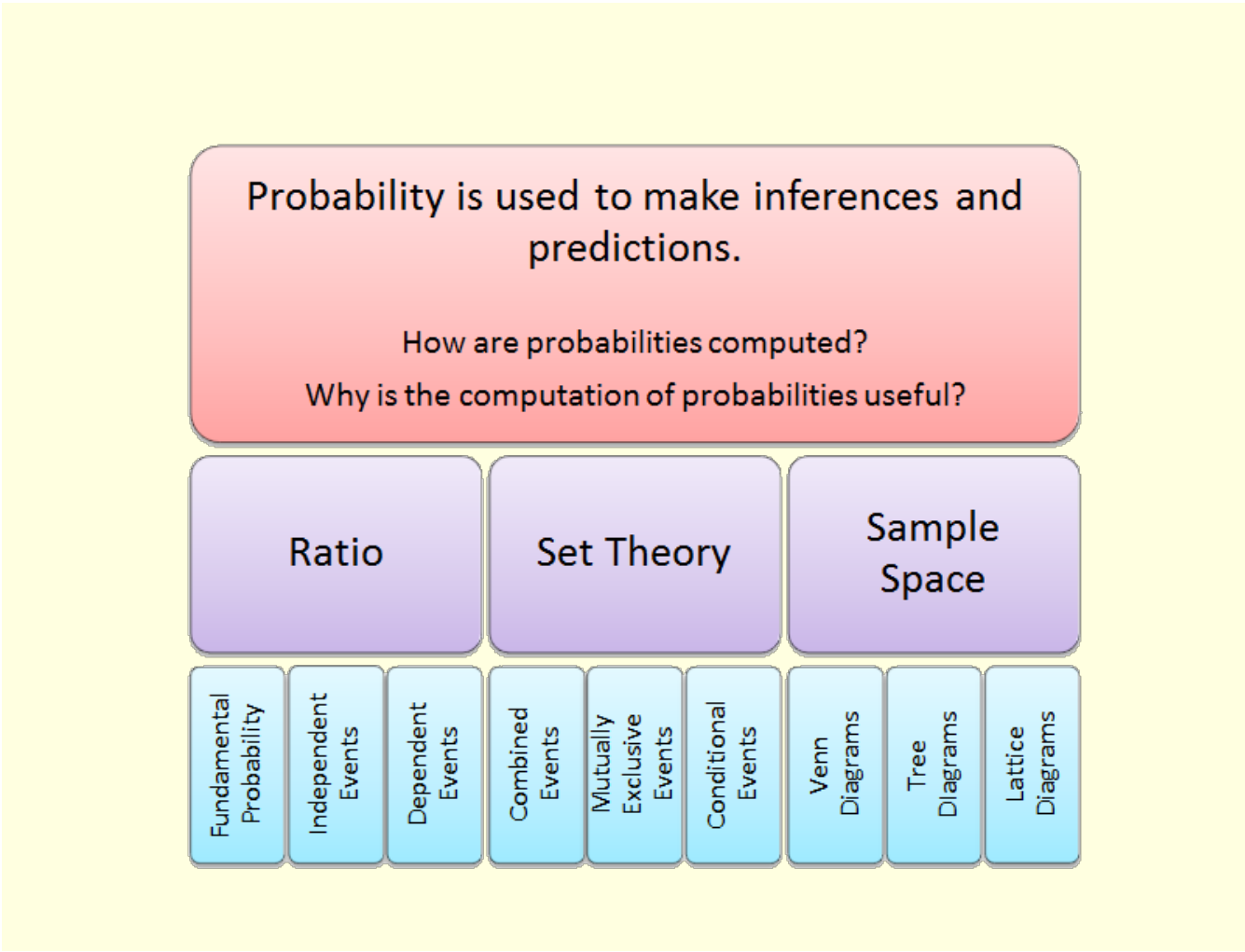
P.1 What is Probability?


Probability is used to make inferences and predictions.
How are probabilities computed?
Why is the computation of probabilities useful?
Ratio
Set Theory
Sample Space
Fundamental Probability
Independent Events
Dependent Events
Combined Events
Mutually Exclusive Events
Conditional Events
Venn Diagrams
Tree Diagrams
Lattice Diagrams

① $P(\text{blue}) = \frac{1}{4}$

② $P(\text{red}) = \frac{6}{22} = \frac{3}{11}$

$P(\text{G} \cup \text{Y}) = \frac{8}{22} = \frac{4}{11}$

③ $P(\text{girl}) = \frac{30}{30} = 1$

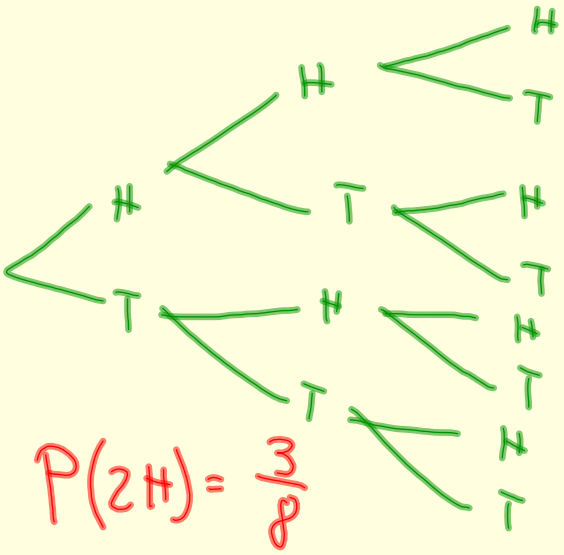
$P(\text{boy}) = \frac{0}{30} = 0$

A red die and a white die are thrown. What is the probability that the sum of the numbers showing on the dice is 9 or 10?

$P(9 \cup 10) = \frac{7}{36}$

White \ Red	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	4	7	8	9	10
5	4	7	8	9	10	11
6	7	8	9	10	11	12

Suppose you toss a coin three times. What is the probability that exactly two of the tosses results in "heads"?

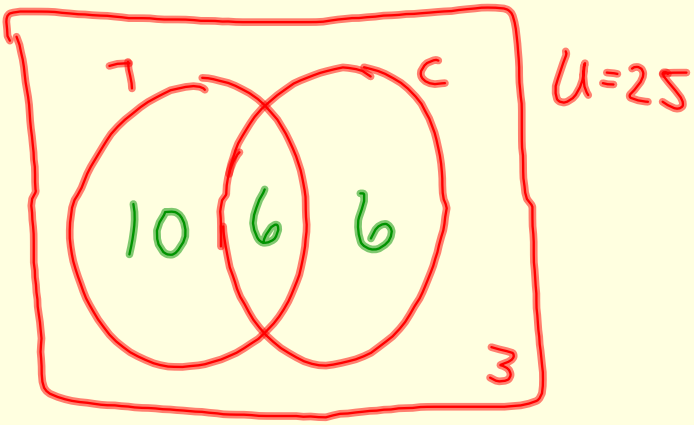


$P(2H) = \frac{3}{8}$

HHH
HHT
HTH
HTT
THH
THT
TTH
TTT

In a class of 25 students, it is found that 16 of the students play tennis, 6 play both tennis and chess, and 3 do not participate in any activities at all.

Find the probability that a student plays chess.



$P(C) = \frac{12}{25}$

⑦ $P(D) = \frac{4}{38}$

$P(D') = 1 - \frac{4}{38} = \frac{34}{38}$

⑧ $P(\text{blue}) = \frac{5}{17}$

$P(\text{blue}') = 1 - \frac{5}{17} = \frac{12}{17}$