

# P.3 Basic Set Theory

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

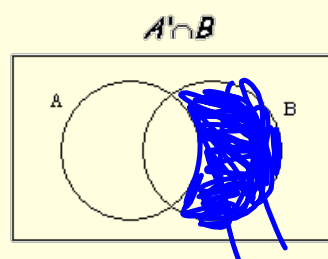
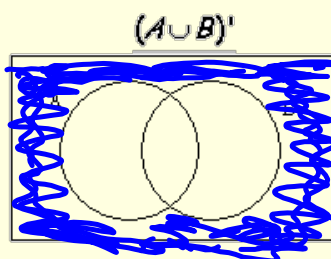
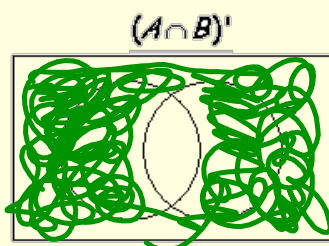
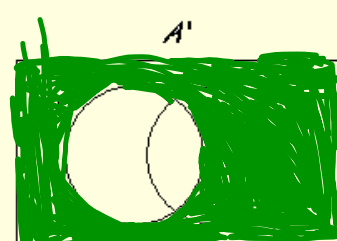
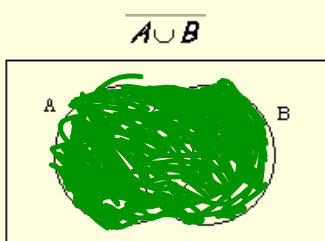
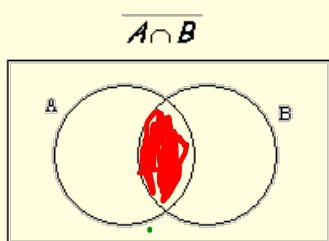
Mutually Exclusive Events

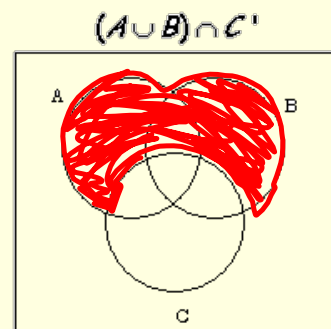
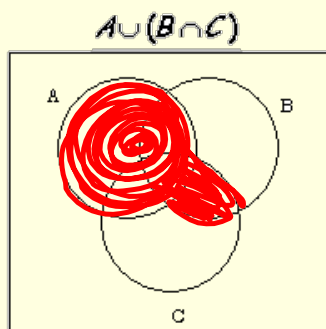
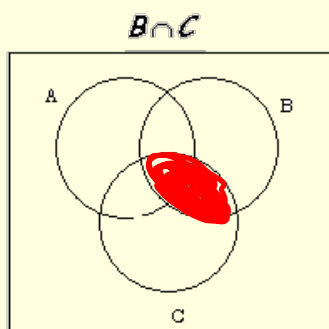
Conditional Events

Venn Diagrams

Tree Diagrams

Lattice Diagrams





In a survey of children who saw three different shows at Walt Disney World, the following information was gathered:

39 children liked The Little Mermaid

43 children liked 101 Dalmatians

56 children liked Mickey Mouse

7 children liked The Little Mermaid and 101 Dalmatians

10 children liked The Little Mermaid and Mickey Mouse

16 children liked 101 Dalmatians and Mickey Mouse

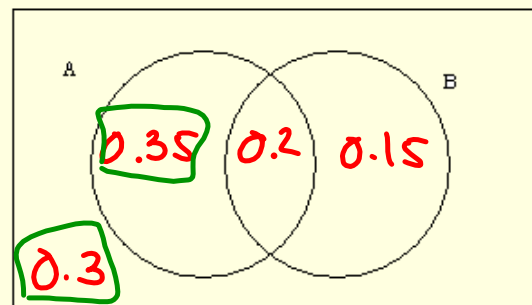
4 children liked The Little Mermaid, 101 Dalmatians, and Mickey Mouse

6 children did not like any of the shows

How many children were surveyed?

1. Given  $P(A) = 0.55$ ,  $P(A \cup B) = 0.7$ , and  $P(A \cap B) = 0.2$ , find  $P(B')$

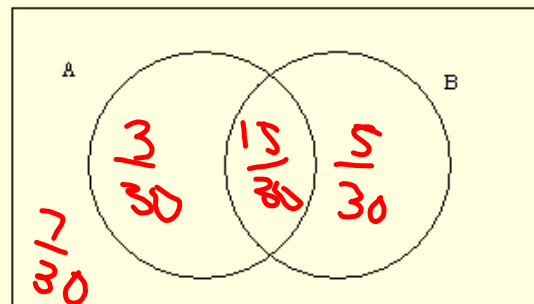
$$P(B') = 0.65$$



$$P(A \cap B) = \frac{15}{30}$$

2. Given  $P(A) = \frac{3}{5}$ ,  $P(B) = \frac{2}{3}$ , and  $P(A \cap B) = \frac{1}{2}$ , find  $P(A \cup B)$

$$P(A) = \frac{18}{30} \quad P(B) = \frac{20}{30}$$

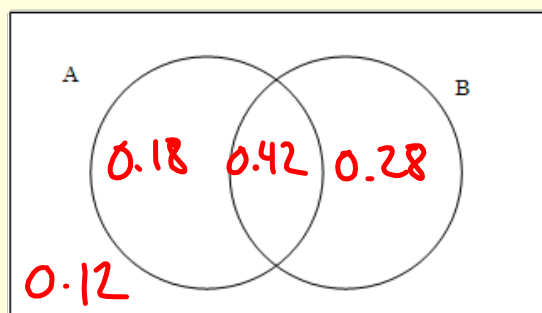


$$P(A \cup B) = \frac{23}{30}$$

3. Given that  $P(A) = 0.6$ ,  $P(B) = 0.7$ , and that A and B are independent events, find  $P(A \cup B)$ ,  $P(A')$ ,  $P(A' \cap B)$ .

Hmmm... What does "independent" mean?  
What formula did we learn?

$$P(A \cap B) = 0.6(.7) = 0.42$$



$$P(A \cup B) = 0.88$$

$$P(A') = 1 - 0.6 = 0.4$$

$$P(A' \cap B) = 0.28$$

