

Dependent Events- when the outcome of one event affects the outcome of a second event

Independent Events- when the outcome of one event does **not** affect the outcome of a second event

Ex. Classify each pair of events as dependent or independent

- a) Spin a spinner then select a marble from a bag that contains marbles of different colors

- b) Select a marble from a bag that contains marbles of different colors, then put that marble aside and select a second marble from the bag.

Probability of Independent Events

If A and B are independent events, then $P(A \text{ and } B) = P(A) * P(B)$

Ex. If $P(A) = 0.3$ and $P(B) = 0.7$ find $P(A \text{ and } B)$

Ex. A box contains 20 red marbles and 30 blue marbles. A second box contains 10 white marbles and 47 black marbles. If you chose one marble from each box without looking, what is the probability that you get a blue marble and a black marble?

Mutually Exclusive Events- two events that cannot happen at the same time.

Are the following events mutually exclusive or not?

Ex. Rolling a 5 or a 3 on a number cube

Ex. Rolling an odd number or a number less than 3

Probability of A or B

- If A and B are mutually exclusive, $P(A \text{ or } B) = P(A) + P(B)$
- If A and B are **not** mutually exclusive, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Ex. At a restaurant customers get a choice of one of four vegetables with a main course. About 33% choose green beans, and about 28% choose spinach. What is the probability that a customer will choose green beans or spinach?

Is this event mutually exclusive?

Ex. A spinner has 20 equal styled sections numbered 1 through 20. What is the probability that the number you spin will be a multiple of 2 or a multiple of 3?

Is this event mutually exclusive?

Multiples of 2:

Multiples of 3:

Venn Diagrams



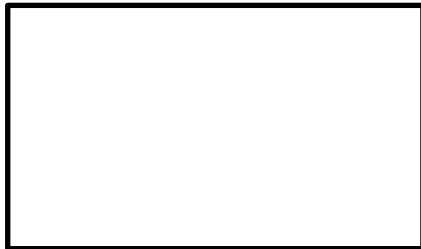
Sample Space- all possible elements

A all possible elements in A

Not A



Mutually Exclusive Events



Not Mutually Exclusive Events



A and B ($A \cap B$) ME



A and B ($A \cap B$) Not ME



A or B ($A \cup B$) ME



A or B ($A \cup B$) Not ME



Tree Diagrams

Ex. Create a tree diagram for the gender of children in a family with 2 children

a) What is the probability that the family has 1 male and 1 female?

b) What is the probability that the family has only males?

c) What is the probability that the family has only females?

d) What do all of the probabilities add up to?