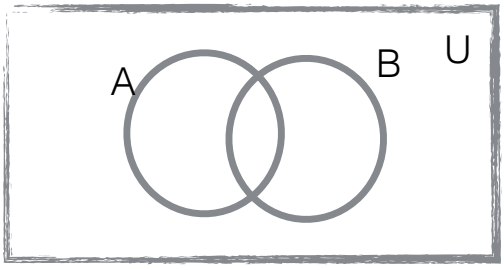
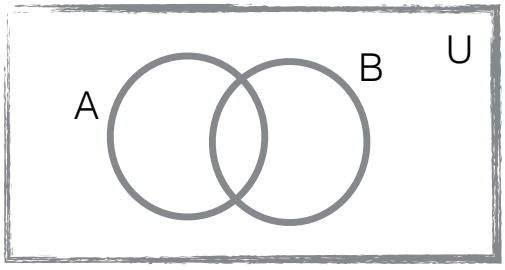
Venn Diagram

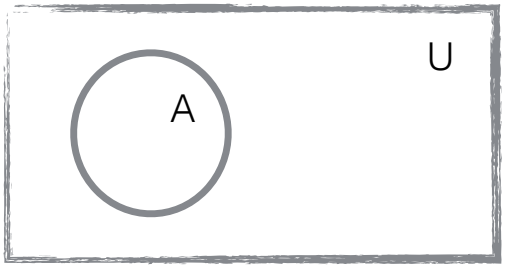
A U B

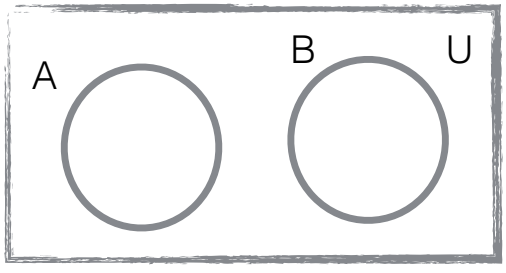


A ∩ B



A’





mutually exclusive:

4. The events A and B are such that $\mathrm{P}(A) = 0.5$, $\mathrm{P}(B) = 0.7$ and $\mathrm{P}(A \cap B) = 0.2$. Find

(a) $\mathrm{P}(A \cup B)$ (b) $\mathrm{P}(B')$ (c) $\mathrm{P}(A' \cap B)$

5. The events A and B are such that $p(A) = 0.35$, $p(B) = 0.5$ and $p(A \cap B) = 0.15$. Using a Venn diagram (where appropriate) find:

(a) $p(A')$ (b) $p(A \cup B)$ (c) $p(A \cup B')$.

6. The events A and B are such that $p(A) = 0.45$, $p(B) = 0.7$ and $p(A \cap B) = 0.20$. Using a Venn diagram (where appropriate) find:

(a) $p(A \cup B)$ (b) $p(A' \cap B')$ (c) $p((A \cap B)')$.

Tree Diagram
&
Conditional Probability

Conditional Probability

Draw Tree Diagram:
The weather forecast says that there is 2% chance of raining.
If it rains, the chance of me going to play tennis is 10%.
If it does not rain, the chance of me going to play tennis is 80%

Conditional Probability

If A and B are two events, then **the conditional probability of event A given event B** is found using $P(A|B) = \frac{P(A \cap B)}{P(B)}$, $P(B) \neq 0$.

***A* and *B* are independent if, and only if**
$P(A \cap B) = P(A) \times P(B)$

Given!!!!

Consequence *Condition*

P(Play Tennis | Rain) =

1. Two events A and B are such that $p(A) = 0.6$, $p(B) = 0.4$ and $p(A \cap B) = 0.3$. Find the probability of the following events:

(a) $A \cup B$ (b) $A|B$ (c) $B|A$ (d) $A|B'$

2. A and B are two events such that $p(A) = 0.3$, $p(B) = 0.5$ and $p(A \cup B) = 0.55$ Find the probability of the following events:

(a) $A|B$ (b) $B|A$ (c) $A|B'$ (d) $A'|B'$

3. Urn A contains 9 cubes of which 4 are red. Urn B contains 5 cubes of which 2 are red. A cube is drawn at random and in succesion from each urn.

(a) Draw a tree diagram representing this process.

(b) Find the probability that both cubes are red.

(c) Find the probability that only 1 cube is red.

(d) If only 1 cube is red, find the probability that it came from urn A.

4. A box contains 5 red, 3 black, and 2 white cubes. A cube is randomly drawn and has its colour noted. The cube is then replaced, together with 2 more of the same colour. A second cube is then drawn.

(a) Find the probability that the first cube selected is red.

(b) Find the probability that the second cube selected is black.

(c) Given that the first cube selected was red, what is the probability that the second cube selected is black?

Probability Distribution

Probability Distribution

List all the possibility you toss a coin 3 times.
x = number of heads observed in 3 tosses of a coin.

What can be the value of x ? _____

X			
P(X=x)			

Probability Distribution

1. Find the value of k, so that the random variable X describes a probability distribution.

x	1	2	3	4	5
$P(X = x)$	0.25	0.20	0.15	k	0.10

Probability Distribution

2. The discrete random variable Y has the following probability distribution

y	1	2	3	4
$P(Y = y)$	β	2β	3β	4β

(a) Find the value of β .

(b) Find i. $P(Y = 2)$

ii. $P(Y > 2)$

Binomial Distribution

Binomial Distribution

EXAMPLE 16.15 A manufacturer finds that 30% of the items produced from one of the assembly lines are defective. During a floor inspection, the manufacturer selects 6 items from this assembly line. Find the probability that the manufacturer finds

(a) two defectives. (b) at least two defectives.