INTRODUCTION TO PROBABILITY   13 OCTOBER 2014

Lesson Description

In this lesson we:

- Discuss the following:
    - Calculating probabilities
    - Unions and intersections

Summary

Introduction to Probability

Probability values always lie between zero and one, an event that is impossible has a probability of zero and an event that is certain has a probability of one.

Terminology:

Experiment:

An experiment refers to an uncertain process

Outcome:

An outcome of an experiment is a single result of that experiment

Sample Space:

The sample space of an experiment is the set of all possible outcomes of that experiment. The sample space is denoted with the symbol S and the size of the sample space (the total number of possible outcomes) is denoted with n(S).

Event: An event is a specific set of outcomes of an experiment that you are interested in. An event is denoted with the letter E and the number of outcomes in the event with n(E).

When all the outcomes of an activity are equally likely to happen you can calculate the probability of anevent E occurring by using:

$$P(E) = \frac{n(E)}{n(S)}$$

i.e.   The probability of an event E is the number of favourable outcomes divided by the number of possible outcomes.

Unions and Intersections

The union of two sets is a new set that contains all of the elements that are in at least one of the two sets. The union is written as AUB

The intersection of two sets is a new set that contains all of the elements that are in both sets. The intersection is written as

A∩B

Test Yourself

A letter is chosen at random from the word RANDOM.

Question 1

What is the probability that the letter is D?

A)   1/6

B)   2/6

C)   5/6

D)   1

Question 2

What is the probability that the letter is a vowel?

A)   1

B)   0

C)   2/6

D)   3/6

Question 3

What is the probability that the letter is not a vowel?

A)   0.5

B)   0.67

C)   0.17

D)   0.33

Question 4

True or false the following are mutually exclusive: Getting a head when tossing a coin and getting a six when rolling a dice.

Improve your Skills

Question 1

Cards numbered 1 to 10 are placed in a bag. A card is drawn at random.

a)   Give the sample space S

b)   Represent the event P, of drawing a prime number

c)   List the event F of drawing a factor of 10

d)   List the event P∪F, of drawing a prime number or a factor of 10

e)   Represent P∩F

Question 2

In a bag there are 15 sweets, seven wrapped in red paper, six wrapped in blue paper and two wrapped in black paper

a) What is the probability of choosing, at random, a sweet wrapped in blue paper?

b) What is the probability of choosing, at random, a sweet wrapped in black paper?

c) Assuming you were successful in choosing a sweet wrapped in black paper, what is the probability of choosing a second sweet wrapped in black paper from the sweets that are left?

Question 3

In one bag there are five cards numbered 1,3,5,7 and 9. in another bag there are four cards numbered 2,4,6 and 8. One card is drawn at random from each bag and the values of the two cards are added.

a) Use a table to list all the possible outcomes

b) What is the probability that:

    i) the sum is an odd number

    ii) the sum is 13

    iii) the sum is a multiple of 5