

PROBABILITY CALCULATIONS

20 OCTOBER 2014



Lesson Description

In this lesson we:

- Work through the following:
 - Mutually Exclusive events
 - Complementary events
 - Calculating probabilities
 - Tree Diagrams



Summary

When all the outcomes of an activity are equally likely to happen you can calculate the probability of an event 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.

Probability identity: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Mutually Exclusive Events

- Events that cannot occur at the same time
- Events that have no intersection

∴ if A & B are mutually exclusive; $P(A \cup B) = P(A) + P(B)$

Complementary Events

- Mutually exclusive
 - if A & B are complementary: $P(A) + P(B) = 1$
- *A can be written as B' or as "not B"



Test Yourself

A letter is chosen at random from the word RANDOM.

Question 1

True or False: If two events are mutually exclusive and if together they have a probability of one, then they are complementary to each other.

Question 2

True or False: If $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ then A and B are mutually exclusive events.

Use the following information to answer questions 3-5

A bag contains five red discs, three blue discs and two yellow discs. A disc is drawn at random from the bag.

Question 3

The probability that the disc drawn is red is:

- A) 0.5
- B) 0.67
- C) 0.17
- D) 0.33

Question 4

The probability that the disc drawn is blue is:

- A) 0.25
- B) 0.5
- C) 0.3
- D) 0.4

Question 5

The probability that the disc drawn is red or yellow is:

- A) 0.25
- B) 0.7
- C) 0.63
- D) 0.85

**Improve your Skills****Question 1**

A fruit bowl contains; 5 apples, 3 bananas and 2 oranges. If a fruit is randomly selected from the bowl, calculate the probability that the fruit selected is:

- a) An apple or a banana
- b) Not a banana

Question 2

In a class of 38 learners at a girls' school, 24 play the piano, 30 play the guitar and 4 play neither instrument. If a girl is chosen at random, calculate the probability that she plays:

- a) both instruments
- b) piano only
- c) neither instrument
- d) piano or guitar

Question 3

Customers at a shop were asked if they had bought milk, meat or both.

150 were questioned and the answers were:

125 bought milk

85 bought meat

70 bought both

- a) How many bought neither milk nor meat?
- b) Draw a Venn diagram to illustrate the information
- c) What is the probability that a randomly chosen customer bought:
1) meat but no milk 2) meat or milk?