Introduction to Probability

Tutorial 1

1. (a) What is the sample space when a coin is tossed 3 times?

   (b) What is the sample space for counting the number of females in a group of n people?

   (c) What is the sample space for the number of aces in a hand of 13 playing cards?

   (d) What is the sample space for a person's birthday?

   (e) A car repair is performed either on time or late and either satisfactorily or unsatisfactorily. What is the sample space for a car repair?

   (f) A bag contains balls that are either red or blue and either dull or shiny. What is the sample space when a ball is chosen from the bag?

2. A probability value p is often reported as an *odds ratio*, which is $\frac{p}{1-p}$. This is the ratio of the probability that the event happens to the probability that an event does not happen.

   (a) If the odds ratio is 1, what is p?

   (b) If the odds ratio is 2, what is p?

   (c) If $p = 0.25$, what is the odds ratio?

   (d) What are the possible values for the odds ratio?

3. (a) An experiment has 5 outcomes: I, II, III, IV and V. If $P(\text{I}) = 0.13$, $P(\text{II}) = 0.24$, $P(\text{III}) = 0.07$ and $P(\text{IV}) = 0.38$, what is $P(\text{V})$?

   (b) An experiment has 5 outcomes: I, II, III, IV and V. If $P(\text{I}) = 0.08$, $P(\text{II}) = 0.2$, $P(\text{III}) = 0.33$, what are the possible values for the probability of outcome V?
   If outcomes IV and V are equally likely, what are their probabilities values?

4. An experiment has 3 outcomes: I, II and III. If outcome I is twice likely as outcome II and outcome II is 3 times as likely as outcome III, what are the probability values of the 3 outcomes?

5. A company's advertising expenditure is either low with probability 0.28, average with probability 0.55, or high with probability p. What is p?