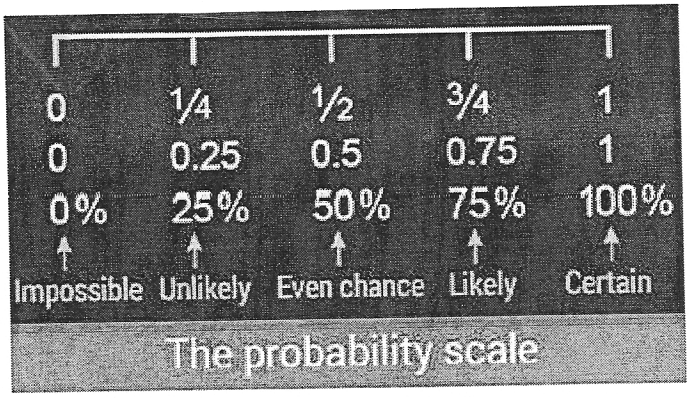
Probability Notes

6.1 The Probability Scale



Probabilities are given on a scale of 0 to 1, as decimals or as fractions; sometimes probabilities are expressed as percentages using a scale of 0% to 100%, particularly on weather forecasts.

Example 1

Decide whether or not each of the statements below is reasonable.

(a) The probability that it will snow on Christmas Day in London is 0.9.

(b) The probability that you will win a raffle prize is 0.5.

(c) The probability that you will go to bed before midnight tonight is 0.99.

(d) The probability that your pocket money is doubled tomorrow is 0.01.

Solution

(a) This is *not reasonable* as the probability given is much too high. It very rarely snows in London in late December, so the probability should be close to 0.

(b) This probability is far too high. You would need to have bought half of all the tickets sold to obtain this probability, so this statement is *not reasonable*.

(c) This is a *reasonable* statement as it is very likely that you will go to bed before midnight, but not certain that you will.

(d) This is a *reasonable* statement, as it is very unlikely that your pocket money will be doubled tomorrow, but not totally impossible.

Example 2

On a probability scale, mark and estimate the probability that:

(a) it will rain tomorrow,

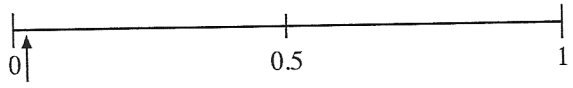
(b) England will win their next football match,

(c) someone in your class has a birthday tomorrow.

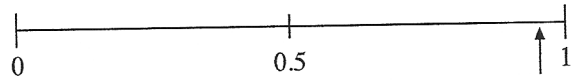
Solution

(a) This will depend on the time of year and the prevailing weather conditions.

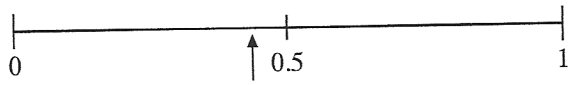
During a dry spell in summer,



During a wet spell in winter,



(b) Based on their recent form, it is reasonable to say that England are slightly more likely to draw or lose their next match than to win it, so an estimate would be a little less than 0.5.



(c) The probability of this will be fairly small, as you can expect there to be about 2 or 3 birthdays per month for pupils in a class of about 30 pupils.