Solutions to "2.11 Exercises"

(**E2.1**) A card is drawn from a shuffled pack of 52 cards. What is the probability of drawing a ten or a spade?

Solution: p(ten) = 4/52, p(spade) = 13/52 = ¼, p(ten of spades) = 1/52.

Therefore, p(drawing a ten or a spade) = 4/52 + 13/52 – 1/52 = 16/52 = 4/13.

(**E2.2**) Records of service requests at a garage and their probabilities are as follows:

Daily Demand	**Probability**
5	0.3
6	0.7

Daily demand is independent (e.g. to-morrow's demand is independent of to-day's demand).

What is the probability that over a two-day period the number of requests will be

a) 10 requests, b) 11 requests and c) 12 requests?

Solution:

a) p(10 requests) = p(5 and 5) = 0.3× 0.3 = 0.09

b) p(11 requests) = p(5 and 6) + p(6 and 5) = 0.3×0.7 + 0.7×0.3 = 0.42

c) p(12 requests) = p(6 and 6) = 0.7×0.7 = 0.49

Check: p(10 requests) + p(11 requests) + p(12 requests) = 0.09 + 0.42 + 0.49 = 1.0

(**E2.3**) Analysis of a questionnaire completed by holiday makers showed that 0.75 classified their holiday as good at resort Costa Lotta. The probability of hot weather in this resort is 0.6. If the probability of regarding the holiday as good given hot weather is 0.9, what is the probability that there was hot weather if a holiday maker considers his holiday good?

Solution: Let H = hot weather (event), G = good holiday (event) => we need p(H|G).

We are given p(G) = 0.75, p(H) = 0.6 and p(G|H) = 0.9.

Bayes' theorem => p(H|G) = p(H)p(G|H)/p(G) = 0.6×0.9/0.75 = 0.72 or 72% chance.