

Class Exercise

1. Independence

If A and B are independent events prove that A' and B' are also independent.

2. What form does Bayes' rule for the posterior $p(A|B)$ take if A and B are independent events?

3. A group of girls at a school are taking Advanced Cantonese which come in two modules: C1 and C2. Each girl takes only module C1, or only module C2, or both C1 and C2. The probability that a girl is taking C2 given that she is taking C1 is 0.2. The probability that a girl is taking C1 given that she is taking C2 is 0.33

Find the probability that a girl selected at random

(a) is taking both C1 and C2.

(b) is taking only C1.

4. Roll a fair die 10 times. Compute the probability that you get

(a) at least one 6.

(b) at least one 6 and at least one 5.

(c) three 1's, two 2's, and five 3's.

(d) at least one number occurring exactly 6 times.

5. You have 16 marbles: 3 blue, 4 green, and 9 red. You also have 3 jars. For each of the 16 marbles, you select a jar at random and place the marble into it. Assume that the jars are large enough to accommodate any number of marbles in them.

(a) What is the probability that no jar is empty?

(b) What is the probability that each jar contains 3 red marbles in it?