

TRINITY COLLEGE DUBLIN  
School of Computer Science and Statistics

**Extra Questions**

ST3009: Statistical Methods for Computer Science

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**NOTE: There are many more example questions in the course textbook “A First Course in Probability” by Sheldon Ross.**

- Question 1.** (a) What is the number of ways that we can select 3 consonants from 7 ?  
(b) What is the number of ways we can select 2 vowels from 4 ?  
(c) Out of 7 consonants and 4 vowels, how many ways can 3 consonants and 2 vowels be selected ?  
(d) How many ways can 3 consonants and 2 vowels (5 letters) be rearranged ?

**Question 2.** In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there?

**Question 3.** A bag contains 1 red ball and 4 black balls.

(a) In how many different ways can I draw 2 balls from the bag, i.e. one after another without replacement, where when counting all balls of the same colour are treated as being the same.

(b) In how many different ways can I draw 2 balls from the bag when after drawing each ball I put it back into the bag.

**Question 4.** I toss a coin and if it comes up heads I roll two 4-sided die and otherwise two 6-sided die.

(a) How many arrangements of heads/tails and die outcomes are possible (counting the 4 and 6 sided dice separately).

(b) Out of these arrangements, in how many do the dice rolls sum to 3 ?

(c) In how many do the dice rolls sum to 10 ?

**Question 5.** From a group of 5 women and 7 men:

(a) A committee of 3 is to be formed. How many different committees are possible?

(b) How many different committees consisting of 2 women and 3 men can be formed?

(c) What if 2 of the men are feuding and refuse to serve on the committee together?

**Question 6.** (a) How many different 7-place license plates are possible if the first 2 places are for letters and the other 5 for numbers?

(b) And how many when no letter or number can be repeated in a single license plate.

**Question 7.** A deck of playing cards contains 52 cards consisting of four suits (hearts, spades, clubs or diamonds) and 13 ranks or values (1,2, . . . ,10,jack, queen, king).

(a) You draw one card from the deck and then draw another (without replacement). How many ways could you draw a pair (two cards of the same rank) e.g. 4 of hearts and 4 of spades.

(b) Suppose you now draw three cards. In how many ways can you draw a pair now (two cards of the same rank, the third of a different rank)

**Question 8.** I am stocking a fish tank. The fish shop has four types of sea creature: piranha, crocodile, tuna, catfish. Piranha’s and crocodile’s can share the tank with each other but not with tuna or catfish as they’ll just eat these.

(a) How many combinations of two sea creatures can I place in my tank ?

(b) How many combinations of three sea creatures ?

**Question 9.** John, Jim, Jay, and Jack have formed a band consisting of 4 instruments.

(a) If each of the boys can play all 4 instruments, how many different arrangements are possible?

(b) What if John and Jim can play all 4 instruments, but Jay and Jack can each play only piano and drums (you can assume all four player have an instrument )?

**Question 10.** In how many ways can 3 novels, 2 mathematics books, and 1 chemistry book be arranged on a bookshelf if

(a) the books can be arranged in any order?

(b) the mathematics books must be together and the novels must be together?

(c) the novels must be together, but the other books can be arranged in any order?