Exercise 1 — Calc. : ✓

The coach of a football team selected 24 players for a tournament. He picked 8 defenders, 7 midfielders, 5 strikers and 4 goalkeepers.

1. How many different teams can the coach put together if he chooses a line-up consisting of 1 goalkeeper, 4 defenders, 3 midfielders and 3 strikers? — 4 marks

2. The coach has chosen 4 defenders in his line-up: Virgil, Sergio, Ruben and Trent. The trainer can line up these defenders in the places indicated by the blue dots. How many lineups are possible with these 4 defenders? — 3 marks

3. For a press conference, a group of 4 players is randomly chosen from all 24 players. Calculate the probability that this group consists of 1 defender, 1 midfielder, 1 striker and 1 goalkeeper. — 3 marks

4. The probability that Christiano scores a penalty is 85%. Christiano kicks 5 penalties.

    (a) Calculate the probability that Christiano scores 5 times. — 2 marks
    (b) Calculate the probability that Christiano scores 3 out of 5 attempts. — 2 marks
    (c) Calculate the probability that Christiano scores 4 times at most. — 2 marks

Exercise 2 — Calc. : ✓

In a basket are 5 white and 3 red socks. You take two random socks out of the basket.

1. Draw a tree diagram for this experiment and write down the probabilities for each branch of your tree diagram. — 4 marks

The stochastic variable X is "the number of red socks".

2. Give the probability distribution of X in a table. — 6 marks

3. Calculate the expected value of X. Write down all steps in your calculation. — 4 marks

Exercise 3   Calc. : ✓

The students of a class are represented in the set U.
Set A is the set of pupils who wear glasses.
Set B is the set of students who have blue eyes.

1. Calculate $P(B)$.   2 marks

2. Calculate $P(A \cup B)$.   2 marks

3. Calculate $P(A|B)$.   2 marks

4. Calculate $P(B|\overline{A})$.   2 marks

5. A student with blue eyes leaves the classroom. Calculate the probability that this student is   2 marks
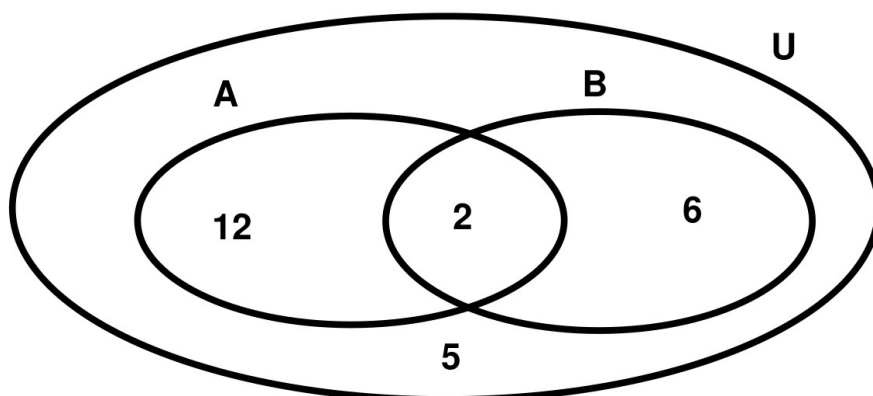   wearing glasses.
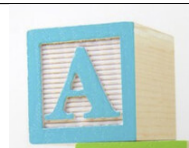

Exercise 4   Calc. : ✓

A box contains letter blocks (see figure).
This box contains the letter blocks C, A, T, M and S.
Els takes 3 random blocks out of the box.

1. Calculate the probability that she can form the word MAT with these three blocks.   4 marks

Peter takes 3 random cubes out of the box.

2. The first block he takes is the letter M. Then he takes 2 more letter blocks. Calculate the   4 marks
   probability that Peter can form the word MAT knowing that his first letter block is the letter
   M.

Exercise 5   Calc. : ✓

The <u>sensitivity</u> of a Covid test is the probability that someone who is infected with Covid tests
positive.
The <u>specificity</u> of a Covid test is the probability that someone who is not infected with Covid
tests negative.
Els and Peter use a Covid self-test with a sensitivity of 97% of a specificity of 99%. In the city
where Els and Peter live, 1% of the population has Covid.
<u>Use a Venn diagram, a table, or a tree scheme for the following calculations.</u>
<u>Write your answers to the following questions in percent and round to 2 decimal places.</u>

1. Calculate the probability that Els tests positive for Covid.   3 marks

2. Calculate the chance that Els tests positive but does not have Covid.   3 marks

3. Peter tests positive. What is the probability that Peter has Covid?   3 marks

4. The city where Els and Peter live has 100 000 inhabitants. If all residents of this city take a   3 marks
   self-test, how many people have a "false positive" test result?

Exercise 6	Calc. : ✓
At a concert there are 135 seats. The organizers of the concert know from experience that only 96% of the people who have bought a ticket will come to the concert. They therefore decide to sell more tickets than there are seats.	
1. Explain why the number of people coming to the concert is a Bernoulli process (binomial experiment).	2 marks
2. The organizers of the concert sell 137 tickets. Calculate the probability of "overbooking". In other words, calculate the probability that more than 135 people will come to the concert.	3 marks