

# Homework 1.1

- True or False?

$$A - B = A \cap \overline{B}$$

$$(A \cup B) - C = A \cup (B - C)$$

$$(A \cup B) \cap C = A \cup (B \cap C)$$

$$A - (\overline{A} \cap B) = A$$

$$A \cap \overline{B} \cap C = (A - B) \cap C$$

## Homework 1.2

Juan is playing the following game: he rolls two dice. If they sum up to 7 he loses a dollar. If they sum up to 2, he wins 2 dollars. Otherwise, he doesn't win nor lose.

After playing this game for a long time, what shall happen? why?

## Homework 1.3

Jerry and Susan have a joint bank account.

Jerry goes to the bank 20% of the days.

Susan goes there 30% of the days.

Together they are at the bank 8% of the days.

- a. Susan was at the bank last Monday. What's the probability that Jerry was there too?
- b. Last Friday, Susan wasn't at the bank. What's the probability that Jerry was there?
- c. Last Wednesday at least one of them was at the bank. What is the probability that both of them were there?

## Homework 1.4

Harold and Mary are studying for a test.

Harold's chances of getting a "B" are 80%. Sharon's chances of getting a "B" are 90%.

The probability of at least one of them getting a "B" is 91%.

- a. What is the probability that only Harold gets a "B"?
- b. What is the probability that only Sharon gets a "B"?
- c. What is the probability that both won't get a "B"?

## Homework 1.5

Jerry and Susan have a joint bank account.

Jerry goes to the bank 20% of the days.

Susan goes there 30% of the days.

Together they are at the bank 8% of the days.

Are the events “Jerry is at the bank” and “Susan is at the bank” independent?

# Homework 1.6

You roll 2 dice.

- a. Are the events “the sum is 6” and “the second die shows 5” independent?
- b. Are the events “the sum is 7” and “the first die shows 5” independent?

## Homework 1.7

An oil company is considering drilling in either TX, AK and NJ. The company may operate in only one state. There is 60% chance the company will choose TX and 10% chance – NJ.

There is 30% chance of finding oil in TX, 20% - in AK, and 10% - in NJ.

1. What's the probability of finding oil?
2. The company decided to drill and found oil. What is the probability that they drilled in TX?

# Homework 1.8

Example 1:

An company is considering an investment.

The outcomes can be as follows:

Success: 20%

Average: 50%

Failure: 30%

The company decides to hire a specialist. His advice is either YES or NO.

From past experience, the company knows that:

$$p(\text{YES}|\text{success}) = 0.9$$

$$p(\text{YES}|\text{Average}) = 0.2$$

$$p(\text{YES}|\text{Failure}) = 0.1$$

The specialist said YES. What is the probability for success?