Ørsted Laboratoriet
Niels Bohr Institutet fAFG
Universitetsparken 5
2100 København

Kontor DS06
Telefon 35 32 04 23
Telefax 35 32 04 60
Email jens@fys.ku.dk

Ugeseddel 9 Uge 45 1999

Tekst til opgaver i afsnit 23.2 i 7. ed. (22.3 i 8. ed.):

Opgave 1: What is the probability of obtaining at least one head in tossing six fair coins?

Opgave 3: Three screws are drawn at random from a lot of 100 screws, 10 of which are defective. Find the probability of the event that all 3 screws drawn are nondefective, assuming that we draw (a) with replacement, (b) without replacement.

Opgave 5: Three boxes contain five chips each, numbered from 1 to 5, and one chip is drawn from each box. Find the probability of the event E that the sum of the numbers on the drawn chips is greater than 4.

Opave 7: If a certain kind of tire has a life exceeding 25 000 miles with probability 0.95, what is the probability that a set of these tires on a car will last longer than 25 000 miles?

Opgave 9: A pressure control apparatus contains 4 electronic tubes. The apparatus will not work unless all tubes are operative. If the probability of failure of each tube during some interval of time is 0.03, what is the corresponding probability of failure of the apparatus?

Opgave 11: If we inspect sheets of paper by drawing 3 sheets without replacement from every lot of 100 sheets, what is the probability of getting 3 clean sheets although 8% of the sheets contain impurities?

Opgave 13: In the rolling two fair dice, what is the probability of getting equal numbers or numbers with an even product?

Opgave 14: Suppose that we draw cards repeatedly and with replacement from a file of 200 cards, 100 of which refer to male and 100 to female persons. What is the probability of obtaining the second "female" card before the third "male" card?

Opgave 15: What is the complementary event of the event considered in Prob. 14? Calculate its probability and use it to check your result in Prob. 14.

Opgave 17: A motor drives an electric generator. During a 30-day period, the motor needs repair with probability 8% and the generator needs repair with probability 4%. What is the probability that during a given period, the entire apparatus will need repair?

Opgave 19: Extending Theorem 4, show that

$$P(A \bigcap B \bigcap C) = P(A)P(B|A)P(C|A \bigcap B)$$

Opgave 20: You may wonder whether in 22.3 Eq. (16) the last relation follows from the others, but the answer is no. To see this, imagine that a chip is drawn from a box containing 4 chips numbered 000, 011, 101, 110, and let A, B, C be the events that the first, second, and third digit, respectively, on the drawn chip is 1. Show that the the first three formulas in (16) hold but the last one does not hold.