



Norges teknisk–naturvitenskapelige  
universitet  
Institutt for matematiske fag

ST1101  
Sannsynlighetsregning  
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Øving 2

- 1 Suppose that two fair dice are tossed. What is the probability that the sum equals ten given that it exceeds eight?
- 2 Find  $P(A \cap B)$  if  $P(A) = 0.2$ ,  $P(B) = 0.4$ , and  $P(A|B) + P(B|A) = 0.75$ .
- 3 Let  $A$  and  $B$  be two events such that  $P((A \cup B)^c) = 0.6$  and  $P(A \cap B) = 0.1$ . Let  $E$  be the event that either  $A$  or  $B$  but not both will occur. Find  $P(E|A \cup B)$ .
- 4 Given that  $P(A) = a$  and  $P(B) = b$ , show that
$$P(A|B) \geq \frac{a + b - 1}{b}$$
- 5 Given that  $P(A) + P(B) = 0.9$ ,  $P(A|B) = 0.5$ , and  $P(B|A) = 0.4$ , find  $P(A)$ .
- 6 If men constitute 47% of the population and tell the truth 78% of the time, while women tell the truth 63% of the time, what is the probability that a person selected at random will answer a question truthfully?
- 7 Following are the percentages of students of State College enrolled in each of the school's main divisions. Also listed are the proportions of students in each division who are women.

Division	%	% Women
Humanities	40	60
Natural Science	10	15
History	30	45
Social Science	20	75

Suppose the registrar selects one person at random. What is the probability that the student selected will be a male?

- 8 A dot.com company ships products from three different warehouses (A, B, and C). Based on customer complaints, it appears that 3% of the shipments coming from A are somehow faulty, as are 5% of the shipments coming from B, and 2% coming from C. Suppose a customer is mailed an order and calls in a complaint the next day. What is the probability the item came from Warehouse C? Assume that Warehouses A, B and C ship 30%, 20%, and 50% of the dot.com's sales, respectively.
- 9 Suppose that  $P(A \cap B) = 0.2$ ,  $P(A) = 0.6$ , and  $P(B) = 0.5$ .
- Are  $A$  and  $B$  mutually exclusive?
  - Are  $A$  and  $B$  independent?
  - Find  $P(A^c \cup B^c)$ .
- 10 Spike has a 0.35 chance of passing chemistry and 0.40 in mathematics. His chance of passing both is 0.12. Are the events "Spike passes chemistry" and "Spike passes mathematics" independent? What is the probability that he fails both subjects?
- 11 Suppose that  $P(A) = 1/4$  and  $P(B) = 1/8$ .
- What does  $P(A \cup B)$  equal if
    - $A$  and  $B$  are mutually exclusive?
    - $A$  and  $B$  are independent?
  - What does  $P(A|B)$  equal if
    - $A$  and  $B$  are mutually exclusive?
    - $A$  and  $B$  are independent?