Př. 1 (4b)

1. student, 2. student

a) $P(A) = \frac{\binom{20}{3}\binom{3}{3}}{\binom{20}{3}\binom{20}{3}} = \frac{1}{\binom{20}{3}} = \underline{\underline{\frac{1}{1140}}}$

ty 3 vybrané 1. studentem se už nesmí použít

b) $P(A) = \frac{\binom{20}{3}\binom{17}{3}}{\binom{20}{3}\binom{20}{3}} = \underline{\underline{\frac{34}{57}}}$

Př. 2 (3b)

protože nezávislé: $P(A)\cdot P(B)$, $P(A)\cdot P(C)$, $P(B)\cdot P(C)$, $P(A)\cdot P(B)\cdot P(C)$

$$P(A\cup B\cup C) = P(A)+P(B)+P(C)-P(A\cap B)-P(A\cap C)-P(B\cap C)+P(A\cap B\cap C) =$$

$$= 0{,}1+0{,}1+0{,}1-0{,}01-0{,}01-0{,}01+0{,}001 = 0{,}271 = \underline{\underline{27{,}1\%}}$$

nebo pomocí opačných jevů: $P(\overline{A})P(\overline{B})P(\overline{C})$

$$P(A\cup B\cup C) = 1-P(\overline{A\cup B\cup C}) = 1-P(\overline{A}\cap\overline{B}\cap\overline{C}) = 1-0{,}729 = 0{,}271 = \underline{\underline{27{,}1\%}}$$

Př. 3 (5b)

$\Sigma A_i = \Omega$

→ z místa X můžeme jít 5 směry, nikudy jinudy, nemůžeme jít dvěma směry zároveň ⇒ alkot. pst ($A_i \cap A_j = \emptyset$)

→ $A_1, A_2, \dots A_5$ … vybereme cestu $1, 2, \dots 5$ → $P(A_1) = P(A_2) = \dots P(A_5) = \frac{1}{5}$

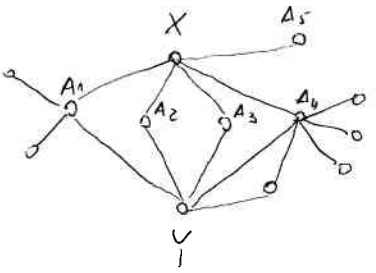
B … dojdeme do Y → $P(B|A_1) = 1/3$

$P(B|A_2) = 1$

$P(B|A_3) = 1$

$P(B|A_4) = 2/5$

$P(B|A_5) = 0$



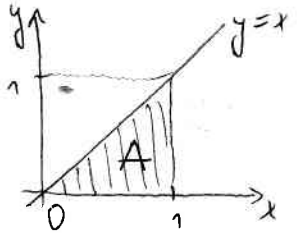
$$\rightarrow P(B) = P(B|A_1)P(A_1)+P(B|A_2)P(A_2)+P(B|A_3)P(A_3)+P(B|A_4)P(A_4)+P(B|A_5)P(A_5) =$$

$$= \frac{1}{3}\cdot\frac{1}{5}+1\cdot\frac{1}{5}+1\cdot\frac{1}{5}+\frac{2}{5}\cdot\frac{1}{5}+0\cdot\frac{1}{5} = \frac{41}{75} = 0{,}5467 = \underline{\underline{54{,}67\%}}$$

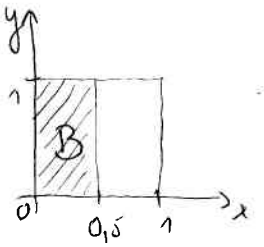
Př. 4 (3b)

A ... $y \leq x$

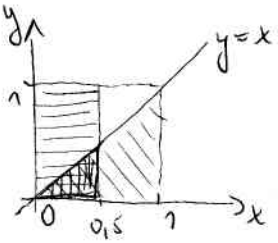
B ... $x \leq 0{,}5$



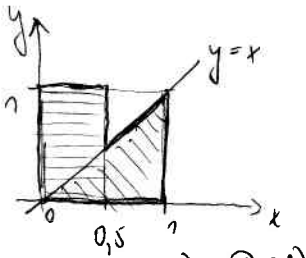
$P(A) = \frac{1/2}{1} = \underline{50\%}$



$P(B) = \frac{1/2}{1} = \underline{50\%}$



$P(A \cap B) = \frac{1/8}{1} = 0{,}125 = \underline{12{,}5\%}$



$P(A \cup B) = P(A) + P(B) - P(A \cap B) =$

$= 0{,}875 = \underline{87{,}5\%}$

Bonus (5b)

A_2 ... lepší karty $\rightarrow P(A_2) = 0{,}05$

A_1 ... horší karty $\rightarrow P(A_1) = 1 - P(A_2) = 0{,}95$

B ... zvýší sázku $\rightarrow P(B|A_1) = 0{,}2$

$P(B|A_2) = 0{,}9$

$$\rightarrow P(A_2|B) = \frac{P(B|A_2) \cdot P(A_2)}{P(B|A_1) \cdot P(A_1) + P(B|A_2) \cdot P(A_2)} =$$

$$= \frac{0{,}9 \cdot 0{,}05}{0{,}2 \cdot 0{,}95 + 0{,}9 \cdot 0{,}05} \doteq 0{,}191 = \underline{19{,}1\%}$$