1

1.1

$$A = \{(2, \cdots), (4, \cdots), (6, \cdots)\}$$
$$B = \{(\cdots, 1), (\cdots, 3), (\cdots, 5)\}$$
$$C = \{(1, 2), \cdots\} \rightarrow 6 \cdot 3$$

$$P[A|C] = \frac{P[A \cap C]}{P[C]} = \frac{9}{18} = 0.5$$

1.2

$$0.25 = P[A \cap B] = P[(\{2, 4, 6\}, \{1, 3, 5\}] = 0.5 \cdot 0.5 = P[A] \cdot P[B]$$
$$\cdots \rightarrow \text{jsou}$$

1.3

$$P[A \cap B \cap C] = P[A \cap B] \rightarrow \text{nejsou}$$

2

$$\text{nezávislé} \wedge P[A \cap B] = 0 \rightarrow P[A] \cdot P[B] = 0 \rightarrow A = \emptyset \vee B = \emptyset$$

3

3.1

$$P[A|(A \wedge B' \wedge C') \vee (A' \wedge B \wedge C') \vee (A' \wedge B' \wedge C)] = \frac{P[A \wedge B' \wedge C']}{P[(A \wedge B' \wedge C'] + P[A' \wedge B \wedge C'] + P[A' \wedge B' \wedge C]}$$

3.2

$$F_X(0) = P[x \leq 0] = P[A' \wedge B' \wedge C'] \approx 0.2$$
$$F_X(1) = F_X(0) + P[x = 1] = F_X(0) + P[A' \wedge B' \wedge C] + P \cdots \approx 0.7$$
$$F_X(2) \approx 0.9$$
$$F_X(3) = 1$$

4

4.1

$$P[x = k] = \frac{\binom{a}{k} \binom{N-a}{n-k}}{\binom{N}{n}}$$

4.2

$$P[x \geq \frac{n}{2}] = 1 - P[x < \frac{n}{2}] = 1 - F_X(n/2) = 1-$$

5

$$X(k) = P[x = k] = \sum_0^n i \cdot \binom{n}{i} \cdot \left(\frac{3}{14}\right)^i \cdot \left(\frac{11}{14}\right)^{n-i} = \frac{3}{14} n$$

6

6.1

$$P(x = k) = 0.8^{i-1} \cdot 0.2, E[X] = \sum_{1}^{\infty} i \cdot 0.8^{i-1} \cdot 0.2 = 5, F_X(k) = \sum_{1}^{k} 0.8^{i-1} \cdot 0.2$$

$X \sim Geom(0.2)$

6.2

$$P(x > 5) = 1 - F_x(5)$$

6.3

$$P(x > 10 | x > 5) = P(x > 5)$$

7

$$\sum_{a=0}^{k} \binom{k}{a} \frac{A! * B! * (A + B - k - 1)!}{(A - a - 1)! * (B - k + a)! * (A + B)!}$$

$$\sum_{a=0}^{k} \binom{k}{a} \frac{(A + a)! * (B + k - a - 1)! * (A + B - 1)!}{(A - 1)! * (B - 1)! * (A + B + k)!}$$