1) 1 [illegible] 2 ne

$0.8 \times 0.4 = 0.32$

2) 1 ne 2 ano

$0.2 \times 0.6 = 0.12$

$$\Rightarrow \frac{0.32}{0.44}$$

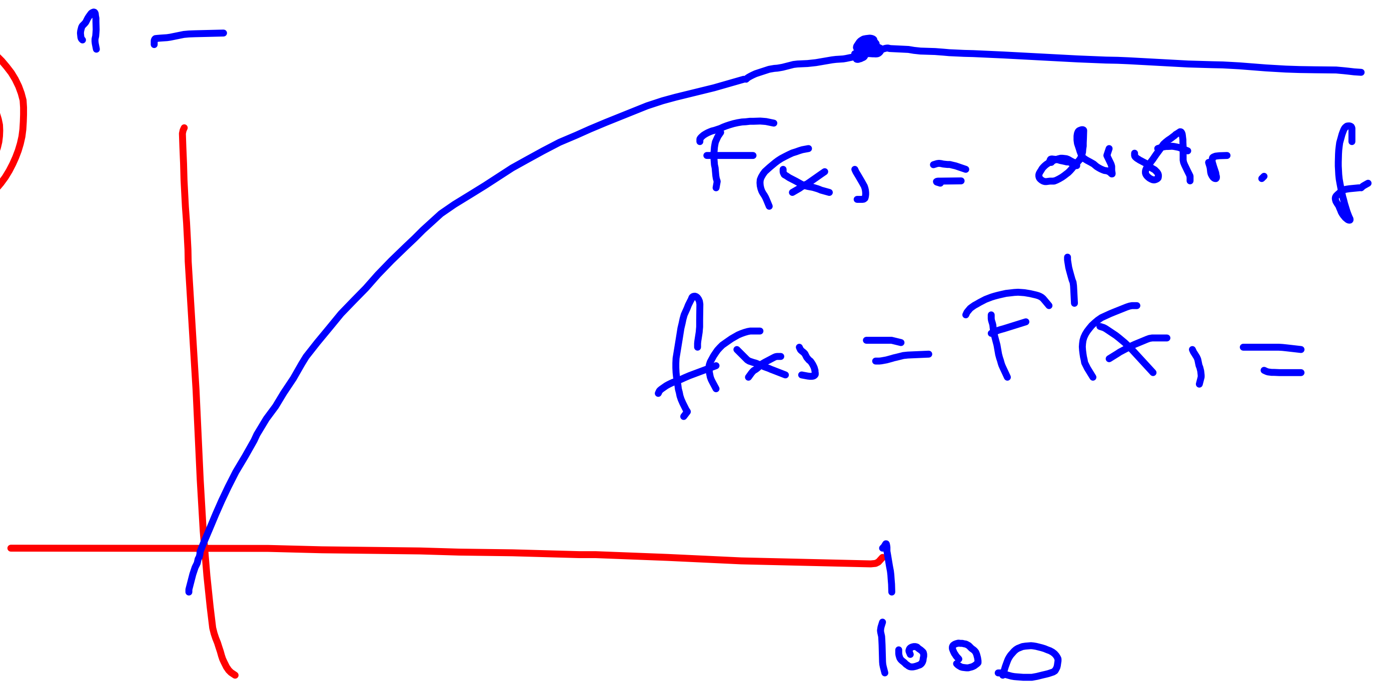
$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

2

1

$$P = \frac{P(A \cap B)}{P(A)} = \frac{2}{7}$$

3



$F(x)$ = distr. fce

$f(x) = F'(x) = \ldots$

Binomické rozdělení

v pokusu ZDAR / NEZDAR

$\qquad\qquad p \qquad\qquad q = 1-p$

$$\omega = (\omega_1, \dots, \omega_n)$$

ω_i počet úspěchů v n-tém pokusu

$$X(\omega) = \sum_{i=1}^{n} \omega_i$$

$$P(\omega_i) = p^{\omega_i}(1-p)^{1-\omega_i}$$

$= k$ v $\binom{n}{k}$ případech

$$P(\omega) = \prod_{i=1}^{n} P(\omega_i) = p^{\sum \omega_i}(1-p)^{n-\sum \omega_i}$$

$$= P(X=k) = \binom{n}{k} p^k (1-p)^{n-k}$$

$k = 0, 1, 2, \dots$

Poissonovo rozdělení

Binomické $Bi(n,p)$

pro případ $n \cdot p \sim \lambda > 0$

$$P(X=k) = \frac{\lambda^k}{k!} e^{-\lambda}$$

$\Omega \supset A \qquad P : A \mapsto P(A) \in [0,1]$

$X(\omega) \in \mathbb{R}$

diskrétní rozdělení — změření mnoho hodnot X / nekonečně "diskrétně" mnoho hodnot

$x_1, x_2, \dots$

distribuční fce

$$F(x) = \sum_{x_i \le x} \underbrace{P(X = x_i)}_{}$$

$\boxed{p(x_i) \text{ pravd. fce}}$

spojité rozdělení

$\boxed{\text{hustota pravd.}}$

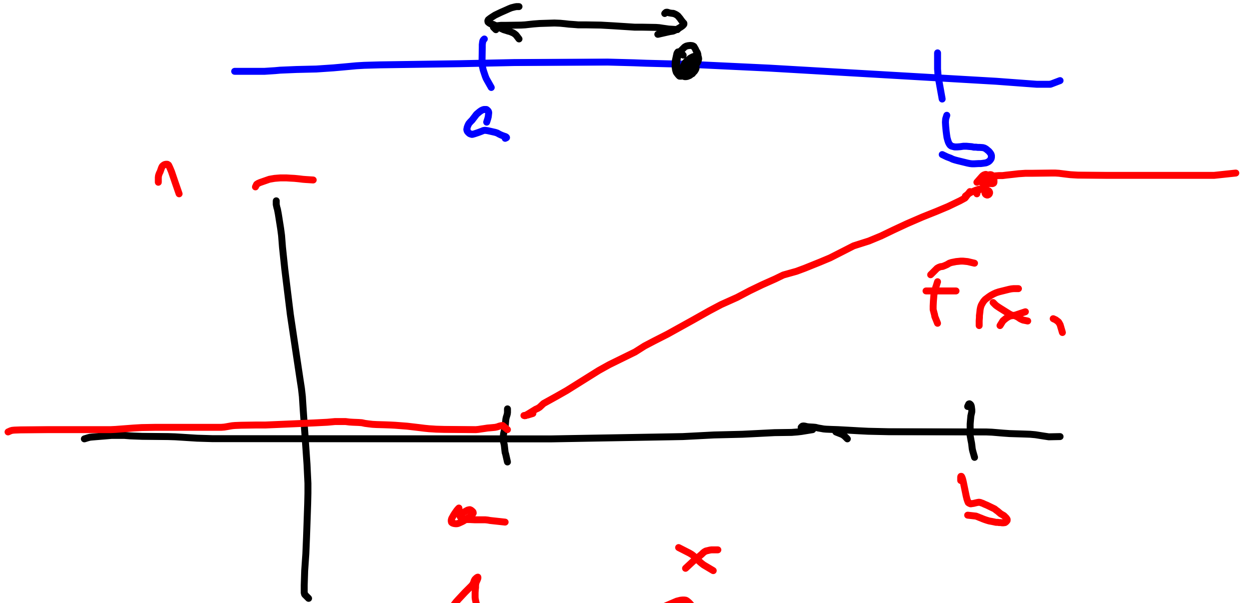
$$P(X \le x) = F(x) = \int_{-\infty}^{x} f(t)\,dt$$

$x \quad x + \Delta x \Rightarrow P(x+\Delta x) - P(x) \doteq f(x)\,dx$

Příklad spojitého rozdělení

rovnoměrné:

všude stejná pravděp.



$P(X<a)=0$

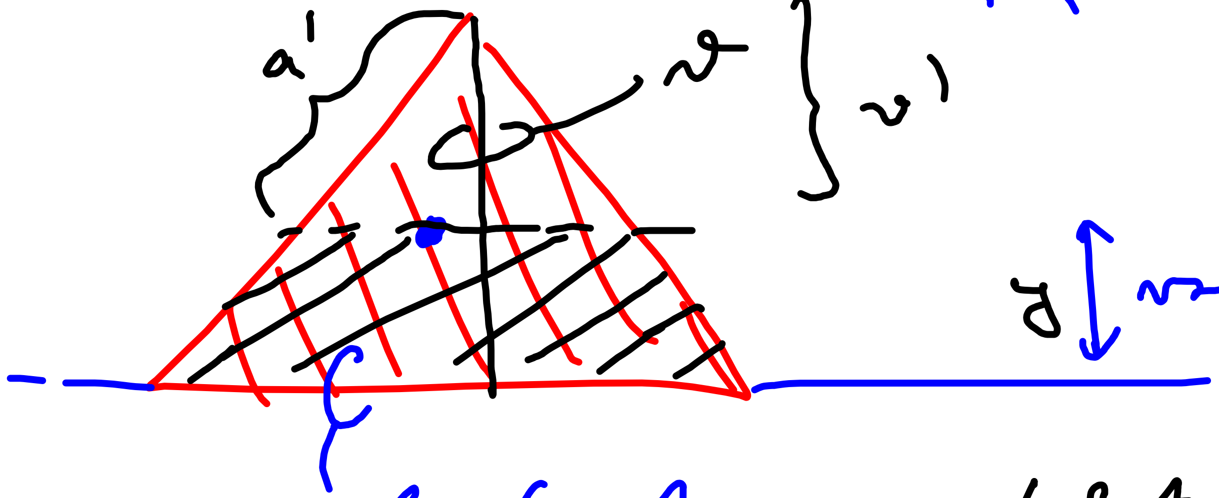
$P(X<c)=1$

$c \geq b$

$$F(x) = \int_a^x f(t)\,dt = \frac{1}{b-a}\int_a^x dt$$

$$f(x) = \begin{cases} \frac{1}{b-a} & \text{pro } a \leq x \leq b \\ 0 & \text{jinak} \end{cases}$$

$$P(X \leq y) = \; ? \; = \frac{\text{plocha pod}}{\text{plocha celk}}$$



zvolená strana velikosti a

výška $v = \frac{\sqrt{3}}{2} a$

plocha $T = \frac{\sqrt{3}}{4} a^2$

$v' = v - y = \frac{\sqrt{3}}{2} a - y$

$a' = \frac{2}{\sqrt{3}} v' = a - \frac{2}{\sqrt{3}} y$

hledaná plocha $P = T - \frac{1}{2} a' \cdot v' =$

$$= \frac{\sqrt{3}}{4} a^2 - \frac{\sqrt{3}}{4} \left(a - \frac{2}{\sqrt{3}} y\right)^2 =$$

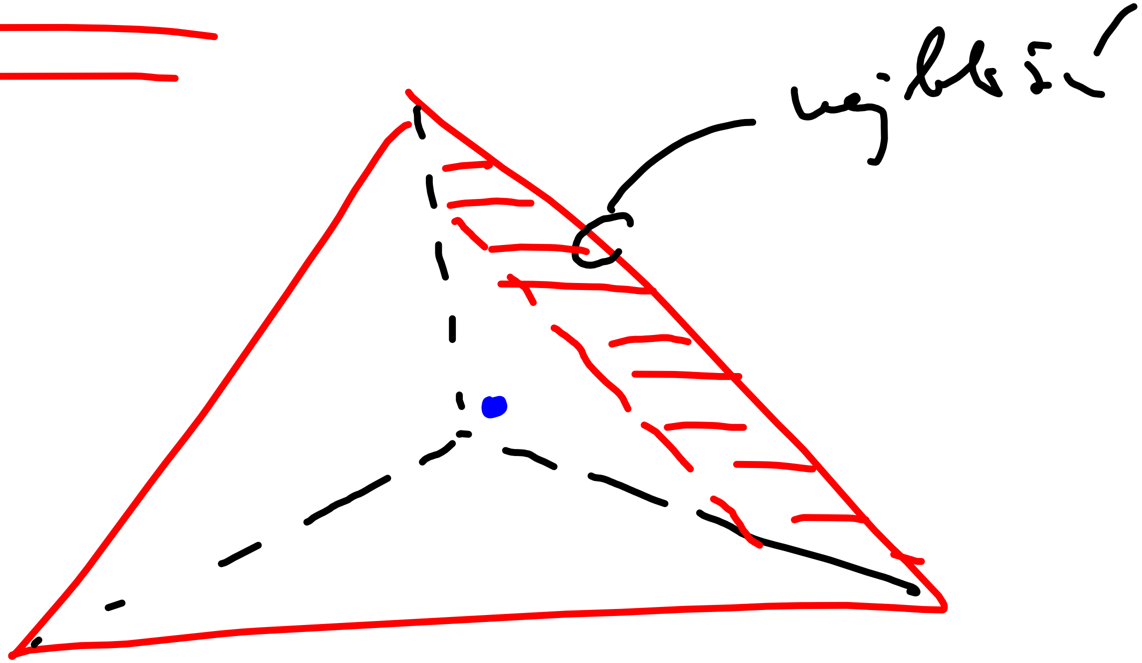
$$= \dots\dots$$

$$P(X \leq y) = \frac{P}{T}$$

$\Rightarrow$ spočteme distribuční f-ce

$$F(y) = P(X \leq y) = \int_{-\infty}^{y} f(x)\,dx$$

$$f(x) = F'(x)$$



1. hráč $0{,}4$

2. hráč $0{,}6$

1.	2.	P
1	0	$0{,}4$
1	1	$0{,}6 \times 0{,}6 = 0{,}36$
2	1	$0{,}6 \times 0{,}4 \times 0{,}4 = 0{,}096$
2	2	$0{,}6 \times 0{,}4 \times 0{,}6 \times 0{,}6 = 0{,}0864$
$\vdots$		
n	$n-1$	$(0{,}24)^{n-1} \cdot 0{,}4$
n	n	$(0{,}24)^{n-1}\, 0{,}6 \cdot 0{,}6$

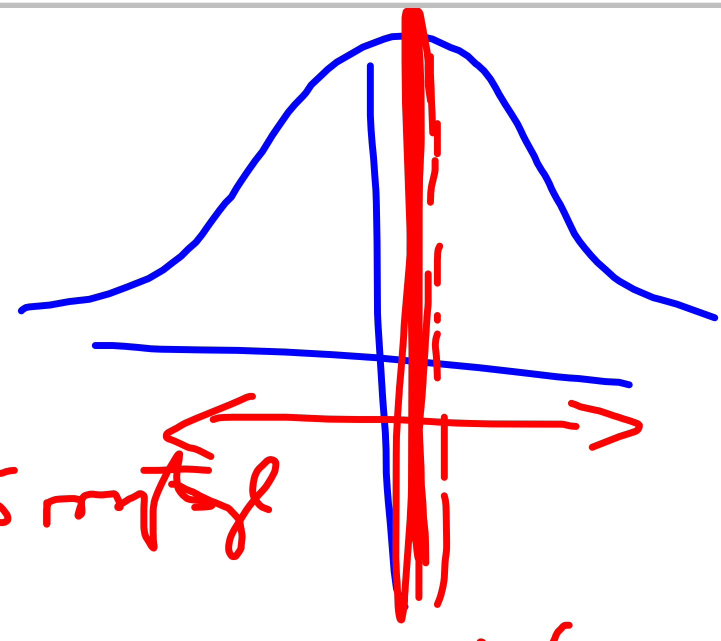
diskrétní

$$EX = \sum_{x_i} x_i \, p(x_i)$$

spojité

$$EX = \int_{-\infty}^{\infty} x f(x) \, dx$$

E-36



střední hodnota

x_i	$p(x_i)$
0	1/8
2	1/2
4	1/4
8	1/8

$$E(X) = 0 \cdot 1/8 + 2 \cdot 1/2 + 4 \cdot 1/4 + 8 \cdot 1/8 = \underline{\underline{3}}$$

$$P(X=j) = \frac{j}{55} \qquad j = 1, \dots, 10$$

$$\sum_{j=1}^{10} \frac{j}{55} = \frac{1}{55} \frac{11 \cdot 10}{2} = 1 \Rightarrow \text{AND}$$

$$EX = \sum_{j=1}^{10} \frac{j^2}{55} = \dots$$

$$P(X=k) = \frac{\lambda^k}{k!} e^{-\lambda} \qquad k = 0, 1, \ldots$$

$$\sum_{k=0}^{\infty} \frac{\lambda^k}{k!} e^{-\lambda} = e^{-\lambda} \sum_{k=0}^{\infty} \frac{\lambda^k}{k!} = e^{-\lambda+\lambda} = 1$$

$$EX = \sum_{k=0}^{\infty} k \cdot \frac{\lambda^k}{k!} e^{-\lambda} = \sum_{k=1}^{\infty} \frac{\lambda \cancel{k}}{\cancel{k}} \frac{\lambda^{k-1}}{(k-1)!} e^{-\lambda}$$

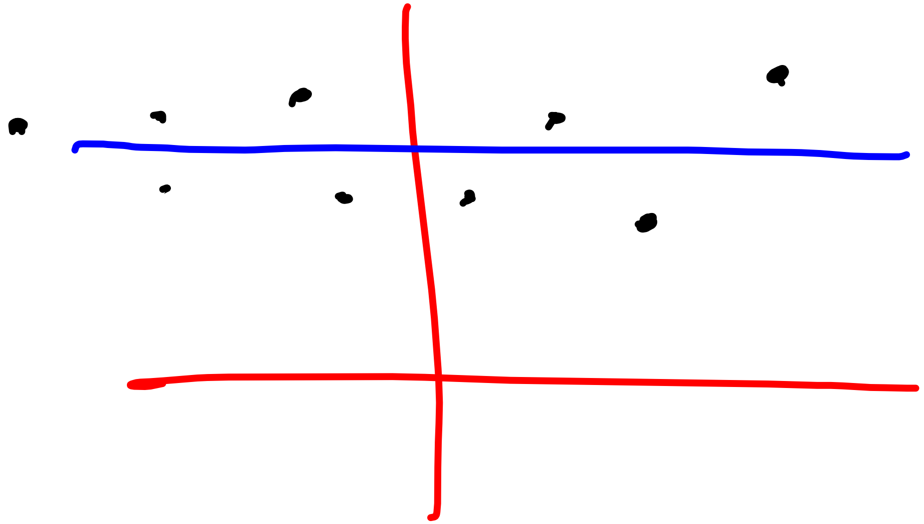
$$= \lambda \cancel{e^{-\lambda} \sum_{k=0}^{\infty} \frac{\lambda^k}{k!}} = \underline{\underline{\lambda}}$$

Rozptyl

$$\operatorname{var} X := E(X - EX)^2$$

$\sqrt{\operatorname{var} X}$ ... směrodatná odchylka

$$\operatorname{var} X = EX^2 - (EX)^2$$



X, Y

$$\operatorname{cov}(X, Y) = E(X - EX)(Y - EY)$$

$$\operatorname{cov}(X, X) = \operatorname{var}(X)$$