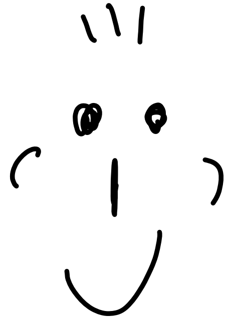
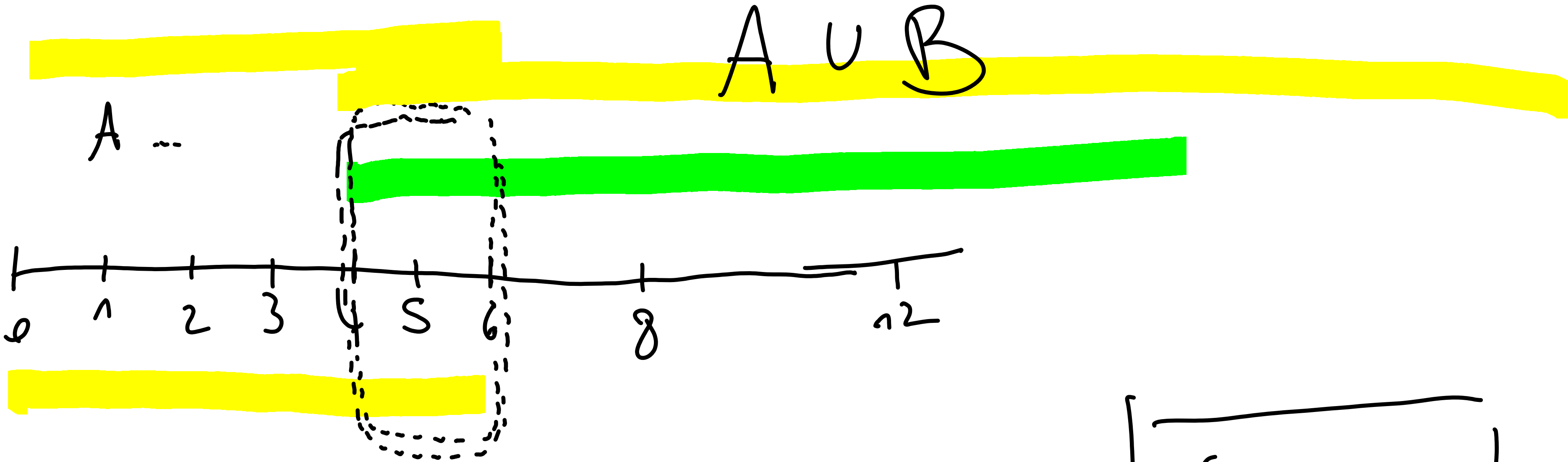
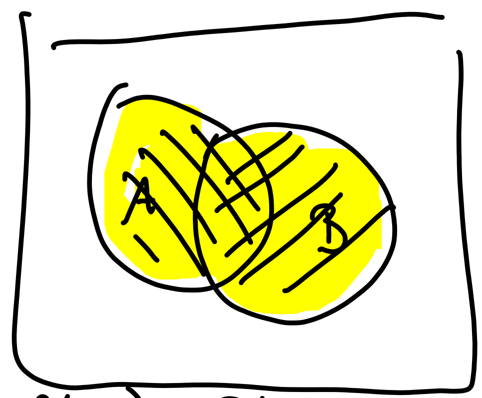
NIX IST SCHÖNER
ALS STATISTIK



1]



$P(A) = 0,9$, $P(B) = 0,6$



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

?

$$P(A \cap B) \stackrel{?}{=} \Longleftrightarrow P(A \cap B) = P(A) + P(B) - P(A \cup B)$$

$$= 0{,}9 + 0{,}6 - 1$$

$$= \underline{\underline{0{,}5}}$$

2

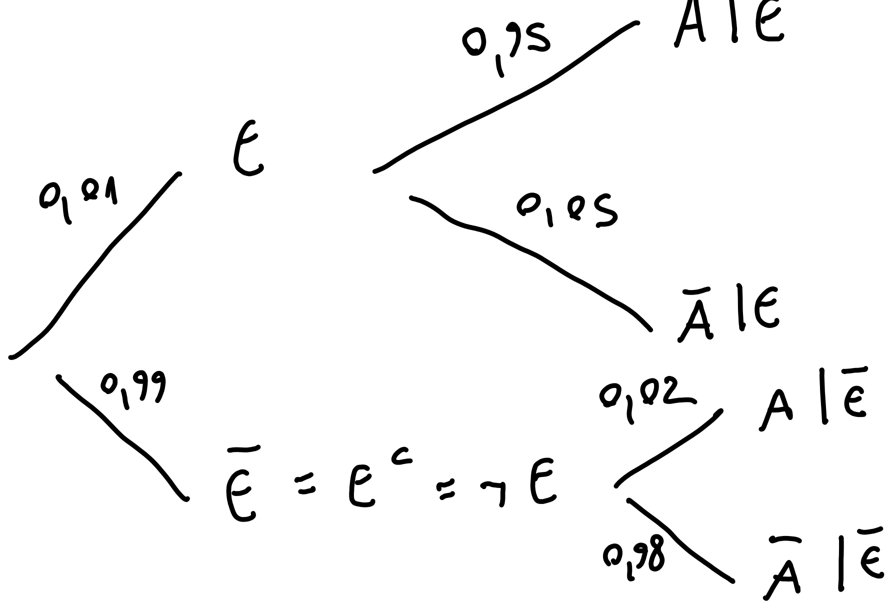
BEDINGTE WSKTEN

WENN

$P(A|B) =$

VERAUSS. HYPOTHESE

2)



GEFRAGT

$P(E|A)$

HAUPTSATZ

NEBENSATZ

BEDINGUNG

/

|

BAYESSCHE FORMEL

$$P(C|D) = \frac{P(D|C)\cdot P(C)}{P(D)} = \frac{P(D|C)\cdot P(C)}{P(D|1.\,\text{HYP.})\cdot P(1.\,\text{HYP.}) + \ldots + P(D|m.\,\text{HYP.})\cdot P(m.\,\text{HYP.})} \quad !!$$

SATZ VON DER TOTALEN WKT.

$$P(E|A) = \frac{P(A|E)\cdot P(E)}{P(A)} = \frac{0{,}95\cdot 0{,}01}{P(A)}$$

$$= \frac{}{P(A|E)\cdot P(E) + P(A|\bar{E})\cdot P(\bar{E})}$$

$$= \frac{0{,}0095}{0{,}95 \cdot 0{,}01 + 0{,}02 \cdot 0{,}99}$$

$$= \frac{0{,}0095}{\underbrace{0{,}0095}_{P(A\cap E)} + \underbrace{0{,}0198}_{P(A\cap \bar{E})}}$$

$$= \frac{0{,}0095}{0{,}0293} = \underline{\underline{0{,}3242}}$$

|

BINOMIALVTLG.

VORAUSS.

n UNABH. EXPERIMENTE

IN JEDEM EINZELNEN EXPERIMENT: ERFOLG ~ p

MISSERFOLG ~ $1-p$

FRAGE: WIE GROß IST DIE WKT. FÜR GENAU x ERFOLGE?

ANTWORT

$$\boxed{P(X=x) = \binom{n}{x} \cdot p^{x} \cdot (1-p)^{n-x}}$$

$B(n, p)$

STICHPROBENUMFANG

X ... # GEHEILTE PATIENTEN

$X \sim B(10;\ 0{,}8)$ ... $P(X \geq 8) = P(X=8) + P(X=9) + P(X=10)$

$$= \binom{10}{8} \cdot 0{,}8^{8} \cdot (1-0{,}8)^{10-8} + \binom{10}{9} \cdot 0{,}8^{9} \cdot (1-0{,}8)^{10-9} + \binom{10}{10} \cdot 0{,}8^{10} \cdot 0{,}2^{10-10}$$

$$\boxed{\binom{n}{x} = \frac{n!}{x! \cdot (n-x)!}}$$

$$= 45 \cdot 0{,}8^{8} \cdot 0{,}2^{2} + 10 \cdot 0{,}8^{9} \cdot 0{,}2 + 1 \cdot 0{,}8^{10} \cdot 1$$

$$= 0{,}302 + 0{,}268 + 0{,}107$$

$$= \underline{\underline{0{,}677}}$$

FAKULTÄT

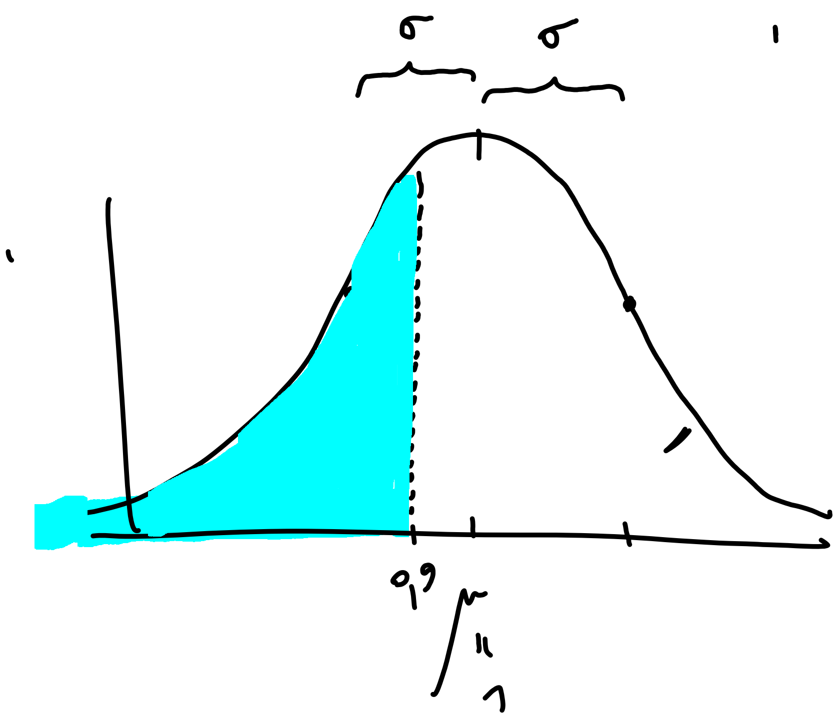
23 (!)

$$n! = 1\cdot 2\cdot 3\cdot \ldots \cdot (n-1)\cdot n$$
$$0! = 1$$

$$\binom{10}{8} = \frac{10!}{8!\cdot(10-8)!} = \frac{\cancel{1\cdot 2\cdot 3\cdot \ldots \cdot 8}\cdot 9\cdot 10}{\cancel{1\cdot 2\cdot 3\cdot \ldots \cdot 7\cdot 8}\cdot (2!)} = \frac{9\cdot 10}{1\cdot 2}$$

$$= 9\cdot 5 = \underline{\underline{45}}$$

$$\binom{10}{9} = \frac{\cancel{10!}^{10}}{\cancel{9!}\cdot 1!} = 10$$



$$X \sim N(\underset{\mu}{\underset{=}{1}} ; \underbrace{0{,}05^2}_{\sigma^2})$$

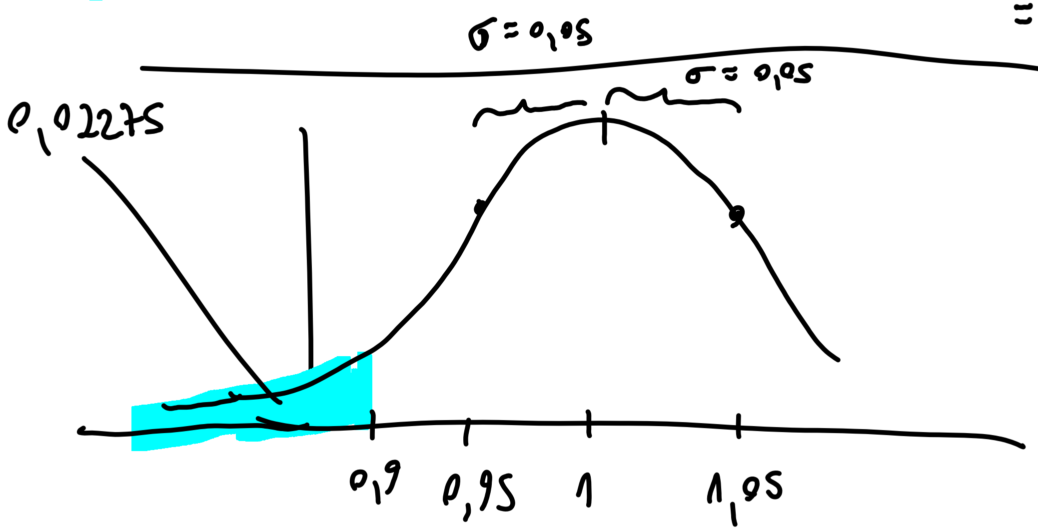
$$P(X < 0{,}9)$$

$$= P\Big(\underbrace{\frac{X-\mu}{\sigma}}_{X_{St}} < \frac{0{,}9-1}{\underset{\sqrt{0{,}0025}}{\underset{=}{0{,}05}}}\Big)$$

$$= P(X_{St} < -2)$$

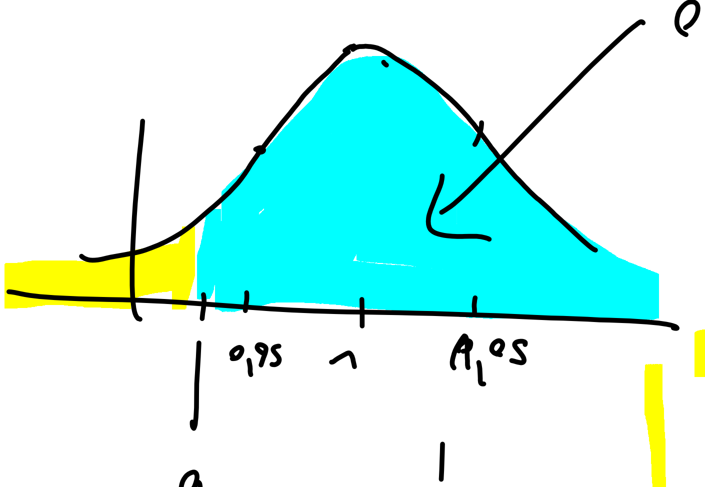
$$\boxed{\phi(-a) = 1 - \phi(a)}$$

$$= \phi(-2)$$
$$= 1 - \phi(2)$$
$$= 1 - 0{,}97725$$
$$= 0{,}02275$$



b) $0{,}95 = P(X > a) = 1 - P(X \le a)$

$= 1 - P\left(X_{St} \le \frac{a-1}{0{,}05}\right)$



$\Leftrightarrow \Phi\left(\frac{a-1}{0{,}05}\right) = 0{,}05$

$\Rightarrow \frac{a-1}{0{,}05} = -1{,}65$

$$\boxed{x_{\alpha} = -x_{1-\alpha}}$$

$$x_{0,05} = -x_{1-0,05} = -x_{0,95}$$

$$= -1,65$$

$$\boxed{a = 0,9175}$$

c) $$P\left(\sum X_i > 12,1\right) = 1 - P\left(\sum X_i \leq 12,1\right)$$

$$\sum X_i \sim N(12;\ \underset{\sigma^2_{\sum X_i}}{\underset{\parallel}{0,03}}) \qquad = 1 - \phi\left(\frac{12,1-12}{\sqrt{0,03}}\right) = 1 - \phi(0,577)$$

$$= 1 - 0,71904 = \underline{\underline{0,28}}$$