1. $\Omega = \{1, 2, 3, \dots, 79, 80\}$ $\quad n = |\Omega| = 80$

(a) A - izbugen je broj manji od 45

$A = \{1, 2, 3, \dots, 44\}$ $\quad m = |A| = 44$

$$P(A) = \frac{m}{n}$$

$$P(A) = \frac{44}{80}$$

$$P(A) = 0,55$$

1. (b) B - izbugen je broj koji nije manji od 45

$B = \{45, 46, \dots, 80\}$ $\quad m = |B| = 36$

$$P(B) = \frac{36}{80}$$

$$P(B) = 0,45$$

(c) C - izbugen je broj deljiv sa 3

$C = \{3, 6, 9, \dots, 78\}$ $\quad m = |C| = 26$

$$P(C) = \frac{26}{80}$$

$$P(C) = 0,325$$

2.

A - први стрелац је погодио мету
B - други стрелац је погодио мету
C - мета је погођена

} НЕЗАВИСНИ ДОГАЂАЈИ

$P(A) = 0,7$
$P(B) = 0,4$

$C = A \cup B$

$P(C) = P(A \cup B)$
$= P(A) + P(B) - P(A) \cdot P(B)$
$= 0,7 + 0,4 - 0,7 \cdot 0,4$
$= 0,28$

$\boxed{P(C) = 0,28}$

3.

$A \cap B = \emptyset \quad (AB = \emptyset)$
$P(A) = 0,33$
$P(B) = 0,55$

(a) $P(A^c) = 1 - P(A)$
$= 1 - 0,33$
$= 0,67$

$\boxed{P(A^c) = 0,67}$

(b) $P(A+B) = P(A) + P(B)$
$= 0,33 + 0,55$
$= 0,88$

$\boxed{P(A+B) = 0,88}$

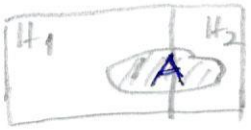
(c) $P(AB) = P(\emptyset)$
$= 0$

$\boxed{P(AB) = 0}$

4.

H_1 – систем ради у нормалним условима $P(H_1)=0,9$

H_2 – систем ради у отежаним условима $P(H_2)=0,1$



A – систем је отказао $P(A) = ?$

$A|H_1$ – систем је отказао у нормалним условима рада

$A|H_2$ – систем је отказао у отежаним условима рада

$P(A|H_1) = 0,05$

$P(A|H_2) = 0,6$

(а) Примена формуле тоталне вероватноће

$$P(A) = \sum_{i=1}^{2} P(A|H_i)P(H_i)$$

$$= P(A|H_1)P(H_1) + P(A|H_2)\cdot P(H_2)$$

$$= 0,05 \cdot 0,9 + 0,6 \cdot 0,1$$

$$= 0,105$$

$$\boxed{P(A) = 0,105}$$

(б) Примена Бајесове формуле

$$P(H_2|A) = \frac{P(H_2)P(A|H_2)}{P(A)}$$

$$= \frac{0,1 \cdot 0,6}{0,105}$$

$$= 0,571428\ldots$$

$$\boxed{P(H_2|A) = 0,571}$$

5.

H_1 – контејнер са производима I фабрике

H_2 – контејнер са производима II фабрике

$$P(H_1) = P(H_2) = \frac{1}{2}$$

$P(A) = ?$

A – изабран је исправан производ

$A|H_1$ – изабран је исправан производ из првог контејнера

$A|H_2$ – изабрант је исправан производ из другог кон.

$$P(A|H_1) = 0,9$$

$$P(A|H_2) = 0,8$$

$$P(A) = P(A|H_1) \cdot P(H_1) + P(A|H_2) P(H_2)$$

$$= 0,9 \cdot \frac{1}{2} + 0,8 \cdot \frac{1}{2}$$

$$= (0,9 + 0,8) \cdot \frac{1}{2}$$

$$= 0,85$$

$$\boxed{P(A) = 0,85}$$

6. H_1 – izabran je proizvod iz I fabrike
H_2 – – II – II – fabrike
H_3 – – III – III – fabrike

$P(H_1) = P(H_2) = P(H_3) = \frac{1}{3}$

A – izabran je ispravan proizvod $\quad P(A) = ?$

$A|H_1$ – izabran je ispravan proizvod iz I fabrike
$A|H_2$ – – II – II –
$A|H_3$ – – III – III –

$P(A|H_1) = 0,9$
$P(A|H_2) = 0,88$
$P(A|H_3) = 0,8$

(a) $P(A) = \sum_{i=1}^{3} P(A|H_i)\,P(H_i)$

$= P(A|H_1)P(H_1) + P(A|H_2)\cdot P(H_2) + P(A|H_3)P(H_3)$

$= 0,9 \cdot \frac{1}{3} + 0,88 \cdot \frac{1}{3} + 0,8 \cdot \frac{1}{3}$

$= (0,9 + 0,88 + 0,8) \cdot \frac{1}{3}$

$= 0,86$

$\boxed{P(A) = 0,86}$

(b) $P(H_3|A) = \dfrac{P(A|H_3)\cdot P(H_3)}{P(A)}$

$= \dfrac{0,8 \cdot \frac{1}{3}}{0,86}$

$= 0,31|00\,7751\ldots$

$\boxed{P(H_3|A) = 0,31}$

7.

H_1 – производ је одрађен на I машини
H_2 – – II – II машини
H_3 – – III – II машини

$P(H_1) = 0,4$
$P(H_2) = 0,35$
$P(H_3) = 0,25$

A – изабран је производ I класе $P(A) = ?$

$A|H_1$ – изабран је производ I класе одрађен на I машини
$A|H_2$ – – II – II машини
$A|H_3$ – – III – II машини

$P(A|H_1) = 0,9$
$P(A|H_2) = 0,8$
$P(A|H_3) = 0,7$

$$P(A) = \sum_{i=1}^{3} P(A|H_i)P(H_i)$$

$$= P(A|H_1)P(H_1) + P(A|H_2)P(H_2) + P(A|H_3)P(H_3)$$

$$= 0,9 \cdot 0,4 + 0,8 \cdot 0,35 + 0,7 \cdot 0,25$$

$$= 0,815$$

$$\boxed{P(A) = 0,815}$$

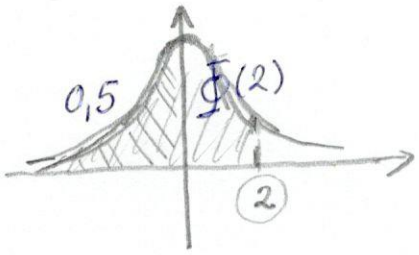
{TABELA 2.}

8. $X : \mathcal{N}(0,1)$

(a) $P\{X < 2\} = 0,5 + \Phi(2)$

$= 0,5 + 0,47982$

$= 0,97982$



(b) $P\{-1,79 < X < 0,54\} = \Phi(0,54) - \Phi(-1,79)$

$= \Phi(0,54) + \Phi(1,79)$

$= 0,43882 + 0,46327$

$= 0,90149$

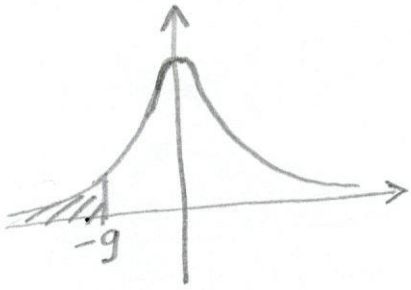
9. $X : \mathcal{N}(20; 4)$

$m = 20, \sigma^2 = 4$

(a) $P\{X \leq 2\} = P\left\{\frac{X-m}{\sigma} \leq \frac{2-m}{\sigma}\right\}$

$= P\left\{\frac{X-20}{2} \leq \frac{2-20}{2}\right\}$

$= P\{X^* \leq -9\}$ $\quad X^* : \mathcal{N}(0,1)$



$= 0,5 - (\Phi(0) - \Phi(-0,9))$

$= 0,5 - \Phi(0,9) = 0,5 - 0,31584$

$= 0,18416$

(b) $P\{18 < X < 25\} = P\left\{\frac{18-20}{2} < \frac{X-20}{2} < \frac{25-20}{2}\right\}$

$= P\{-2 < X^* < 2,5\}$

$= \Phi(2,5) - \Phi(-2) = \Phi(2,5) + \Phi(2)$

$= 0,49379 + 0,47982$

$= 0,97361$

10.

x_i	f_i	F_i	p_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
1	1	1	0,33	1	1	1
2	5	6	0,17	10	4	20
3	10	16	0,33	30	9	90
4	7	23	0,23	28	16	112
5	6	29	0,2	30	25	150
6	1	30	0,33	6	36	36
Σ	30			105		409

$p_i = \frac{f_i}{n}$ $\quad n = 30$

(c) $\overline{x}_n = \frac{1}{n} \sum_i x_i f_i$

$\overline{x}_{30} = \frac{105}{30}$

$\overline{x}_{30} = 3,5$

$$M_e = \begin{cases} y_{\frac{N+1}{2}}, & N \text{ непарно} \\ \frac{y_{\frac{N}{2}} + y_{\frac{N}{2}+1}}{2}, & N \text{ парно} \end{cases}$$

$\{y_N\}$ варијациони низ

1, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4, ...

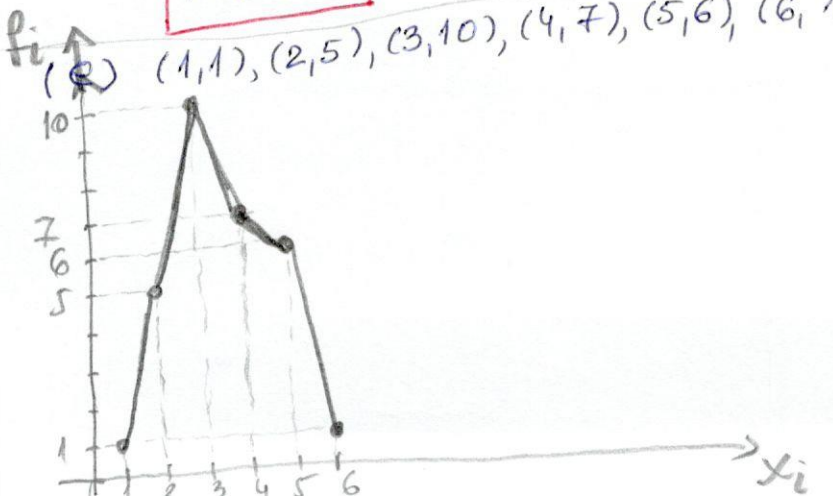
y_{15} y_{16}

$M_e = \frac{y_{15} + y_{16}}{2} = \frac{3+3}{2} = 3$

$M_e = 3$

$M_o = 3$

(b) (1,1), (2,5), (3,10), (4,7), (5,6), (6,1)



(d) $\overline{s}_n^2 = \frac{1}{n} \sum_i x_i^2 f_i - \overline{x}_n^2$

$\overline{s}_{30}^2 = \frac{1}{30} \cdot 409 - 3,5^2$

$= 13,63333... - 12,25$

$= 13,63 - 12,25$

$= 1,38$

$\overline{s}_{30}^2 = 1,38$

$\overline{s}_{30} = \sqrt{\overline{s}_{30}^2}$

$= \sqrt{1,38}$

$= 1,17473...$

$\overline{s}_{30} = 1,17$

$s^2 = \frac{1}{n-1} \left(\sum_i x_i^2 f_i - n \cdot \overline{x}_n^2 \right)$

$s^2 = \frac{1}{29} (409 - 30 \cdot 12,25)$

$= \frac{409 - 367,5}{29}$

$= \frac{41,5}{29} = 1,43103...$

$s^2 = 1,43$

$s = \sqrt{s^2} = \sqrt{1,43}$

$s = 1,196$

11.) интервално груписање података

$n = 30$ $x_{min} = 0$, $x_{max} = 60$

Број интервала - максимални не може прећи број

$5 \cdot \log n = 5 \cdot \log 30 = 7,3856...$ - максимално 7

ширина интервала: $d = \frac{x_{max} - x_{min}}{k}$

број интервала: $k = 1 + 3,322 \log n$

$k = 1 + 3,322 \log 30 = 1 + 4,906... = 5,906...$ $k = 6$

$d = \frac{60 - 0}{5,9} = 10,1694...$ $d = 10$

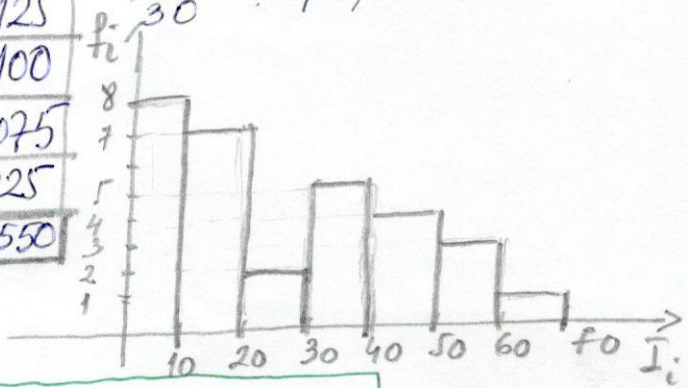
I_i	f_i	F_i	p_i	x_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
[0, 10)	8	8	0,27	5	40	25	200
[10, 20)	7	15	0,23	15	105	225	1575
[20, 30)	2	17	0,07	25	50	625	1250
[30, 40)	5	22	0,17	35	175	1225	6125
[40, 50)	4	26	0,13	45	180	2025	8100
[50, 60)	3	29	0,1	55	165	3025	9075
[60, 70)	1	30	0,03	65	65	4225	4225
	30				780		30550

$p_i = \frac{f_i}{n}$,

$\frac{8}{30} = 0,2666...$

$\frac{2}{30} = 0,0666...$

$\frac{5}{30} = 0,1666...$



(c) $\bar{x}_n = \frac{1}{n} \sum_i x_i f_i$

$\bar{x}_{30} = \frac{780}{30}$

$\bar{x}_{30} = 26$

$M_e = L_{me} + \frac{\frac{N}{2} - F_{me-1}}{f_{me}} d_{me}$

медијални интервал: [20, 30)

$F_{me} > \frac{N}{2}$ $(\frac{N}{2} = 15)$

$L_{me} = 20$, $F_{me-1} = 15$, $f_{me} = 2$

$d_{me} = 10$

$M_e = 20 + \frac{15-15}{2} \cdot 10$

$M_e = 20$

$M_o = L_{mo} + \frac{d_1}{d_1 + d_2} d_{mo}$

модални интервал: [0, 10) (највећа f_i)

$L_{mo} = 0$

$d_1 = f_{mo} - f_{mo-1} = 8 - 0 = 8$

$d_2 = f_{mo} - f_{mo+1} = 8 - 7 = 1$

$M_o = 0 + \frac{8}{8+1} \cdot 10 = \frac{80}{9} = 8,888...$

$M_o = 8,89$

(d) $\bar{s}_n^2 = \frac{1}{n} \sum_i x_i^2 f_i - \bar{x}_n^2$ $s^2 = \frac{1}{n-1} (\sum_i x_i^2 f_i - n \cdot \bar{x}^2)$

$\bar{s}_{30}^2 = \frac{30550}{30} - 26^2$

$= 1018,3\overline{3} - 676$

$\bar{s}_{30}^2 = 342,3$

$\bar{s}_{30} = \sqrt{342,33}$

$\bar{s}_{30} = 18,5$

$s^2 = \frac{1}{29} (30550 - 30 \cdot 676)$

$= \frac{30550 - 20280}{29}$

$= 354,13793...$

$s = 18,82$

$s^2 = 354$

12. $n = 32$

$5 \cdot \log n = 5 \log 32 = 7,5257$ – максимално 7

$k = 1 + 3,322 \cdot \log n = 1 + 3,322 \cdot \log 32 = 6,0001\ldots$ $\boxed{k = 6}$

$x_{max} = 50, \quad x_{min} = 5$

$d = \frac{x_{max} - x_{min}}{k} = \frac{50-5}{6,0001} = 7,49$ ili $d = 7,5$, $d = 8$ $\Big\} \boxed{d = 8}$

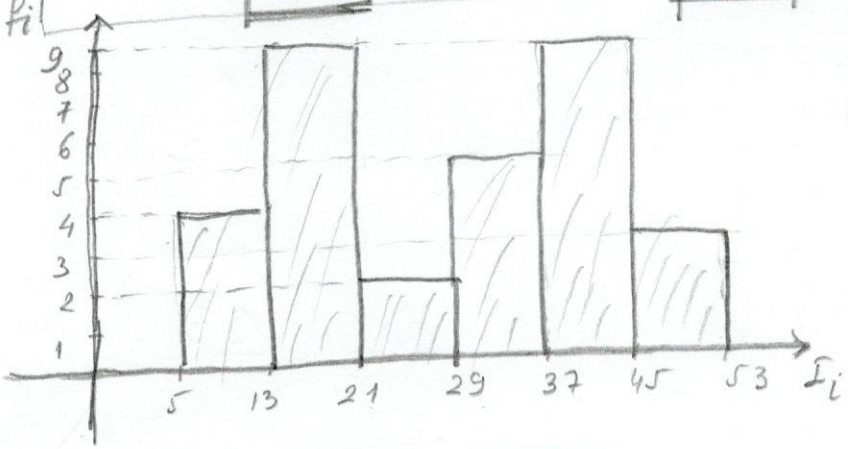
I_i	f_i	F_i	p_i	x_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
[5, 13)	4	4	0,125	9	36	81	324
[13, 21)	9	13	0,281	17	153	289	2601
[21, 29)	2	15	0,0625	25	50	625	1250
[29, 37)	5	18	0,156	33	165	1089	5445
[37, 45)	9	27	0,281	41	369	1681	15129
[45, 53)	3	32	0,094	49	147	2401	7203
	32				920		31952

(c) $\overline{X}_n = \frac{1}{n} \sum_i X_i f_i$

$\overline{x}_{32} = \frac{920}{32}$

$\boxed{\overline{x}_{32} = 28,75}$

$M_e = L_{me} + \frac{\frac{N}{2} - F_{me-1}}{f_{me}} d_{me}$



медијални интервал: [29, 37)
(прва која је F_i већа од $\frac{N}{2}$)

$\frac{N}{2} = 16, \quad L_{me} = 29, \quad F_{me-1} = 15$

$f_{me} = 5, \quad d_{me} = 8$

$M_e = 29 + \frac{16-15}{5} \cdot 8 = 29 + 1,6$

$\boxed{M_e = 30,6}$

$M_o = L_{mo} + \frac{d_1}{d_1 + d_2} \cdot d_{mo}$

медијални интервали: [13, 21) и [37, 45)
(f_i највеће)

[13, 21)

$d_1 = 9 - 4 = 5$

$d_2 = 9 - 2 = 7$

$M_o^1 = 13 + \frac{5}{5+7} \cdot 8 = 13 + \frac{5}{12} \cdot 8$

$= 13 + \frac{40}{12} = 13 + 3,33$

$\boxed{M_o^1 = 26,33}$

[37, 45)

$d_1 = 9 - 5 = 4$

$d_2 = 9 - 3 = 6$

$M_o^2 = 37 + \frac{4}{4+6} \cdot 8$

$= 37 + \frac{32}{10}$

$\boxed{M_o^2 = 40,2}$

(d) $\overline{S}_n^2 = \frac{1}{n} \sum_i X_i^2 f_i - \overline{X}_n^2$

$\overline{S}_{32}^2 = \frac{31952}{32} - 28,75^2$

$= 998,5 - 826,5625$

$= 171,9375$

$\overline{S}_{32}^2 = 171,94$

$\overline{S}_{32} = \sqrt{171,94}$

$\boxed{\overline{S}_{32} = 13,11}$

$S^2 = \frac{1}{n-1} \left(\sum_i x_i^2 f_i - n \overline{X}_n^2 \right)$

$S^2 = \frac{1}{31} (31952 - 32 \cdot 826,5625) =$

$= \frac{31952 - 26450}{31} = \frac{5502}{31} = 177,48$

$S^2 = 177,48$ $\quad S = 13,32$

13.

x_i	f_i	F_i	p_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
1	4	4	0,13	4	1	4
3	7	11	0,23	21	9	63
5	12	23	0,4	60	25	300
7	7	30	0,23	49	49	343
	30			134		710

$n = 30$

(b) $\overline{X}_n = \frac{1}{n} \sum_i X_i f_i$

$\overline{x}_{30} = \frac{134}{30} = 4,46|66\ldots$

$\overline{X}_{30} = 4,47$

n je parno → $M_e = \frac{y_{\frac{n}{2}} + y_{\frac{n}{2}+1}}{2}$

$M_e = \frac{y_{15} + y_{16}}{2} = \frac{5+5}{2} = 5$

$M_e = 5$

$M_o = 5$ (vrednost sa najvećom f_i)

(c) $\overline{S_n}^2 = \frac{1}{n} \sum X_i^2 f_i - \overline{X}_n^2$

$\overline{S}_{30}^2 = \frac{710}{30} - 19,9809$

$= 23,666\ldots - 19,9809$

$= 3,6858$

$\overline{S}_{30} = \sqrt{3,6858} =$

$S^2 = \frac{1}{n-1} \left(\sum_i X_i^2 f_i - n \overline{X}_n^2 \right)$

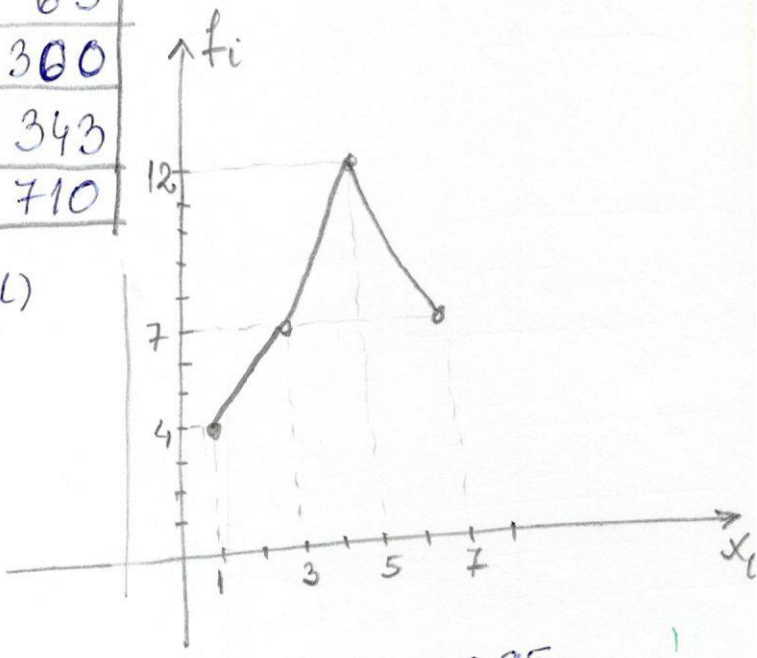
$s^2 = \frac{710 - 30 \cdot 19,9809}{29} = \frac{710 - 599,427}{29}$

$s^2 = \frac{110,573}{29} = 3,81|28\ldots$

$S^2 = 3,81$ $\quad s = \sqrt{3,81} = 1,9519\ldots$

$s = 1,95$

(d)



(e) 95% $\quad \gamma = 0,95$

$\left(\overline{X}_n - c \cdot \frac{S}{\sqrt{n}} ; \overline{X}_n + c \cdot \frac{S}{\sqrt{n}} \right)$

$c \therefore t_{n-1} \quad \frac{1+\gamma}{2}$ (TABELA 1)

$\frac{1+0,95}{2} = \frac{1,95}{2} = 0,975 \therefore t_{29}$

$c = 2,045$

$c \cdot \frac{S}{\sqrt{n}} = \frac{2,045 \cdot 1,95}{\sqrt{30}} = \frac{3,98775}{5,477}$

$= 0,728|0901\ldots$

$(4,47 - 0,728 ; 4,47 + 0,728)$

$(3,742 ; 5,198)$

14. $X : (m, 2^2)$ $\sigma^2 = 2^2$ - poznata disperzija

$\bar{x}_{20} = \frac{1}{20}(1{,}2 + 1{,}3 + 2{,}0 + 1{,}4 + 2{,}3 + \ldots + 2{,}5 + 1{,}4)$

$= \frac{35}{20} = 1{,}75$

$\bar{x}_{20} = 1{,}75$

$\left(\bar{X}_n - c \cdot \frac{\sigma}{\sqrt{n}}, \bar{X}_n + c\frac{\sigma}{\sqrt{n}}\right)$

$c \therefore \frac{1+\gamma}{2}$ $N(0,1)$ - TABELA 3

(a) $\gamma = 0{,}9$

$\frac{1+\gamma}{2} = \frac{1+0{,}9}{2} = \frac{1{,}9}{2} = 0{,}95$ $c = 1{,}6449$

$c \cdot \frac{\sigma}{\sqrt{n}} = \frac{1{,}6449 \cdot 2}{\sqrt{20}} = \frac{3{,}2898}{4{,}472} = 0{,}735644\ldots = 0{,}736$

$(1{,}75 - 0{,}736;\ 1{,}75 + 0{,}736)$ $(1{,}014;\ 2{,}486)$

(b) slično

15.

I_i	f_i	F_i	p_i	x_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
[0,10)	10	10		5	50	25	250
[10,20)	23	33		15	345	225	5175
[20,30)	53	86		25	1325	625	33125
[30,40)	35	121		35	1225	1225	42875
[40,50)	17	138		45	765	2025	34425
[50,60)	12	150		55	660	3025	36300
	150				4370		152150

$n = 150$

(a) $\bar{x}_{150} = \frac{4370}{150} = 29,1333\ldots$

$\bar{x}_{150} = 29,13$

$s^2 = \frac{1}{149}(152150 - 150 \cdot 29,13^2)$

$= \frac{152150 - 127283,535}{149} = \frac{24866,465}{149} = 166,889|02\ldots$

$s^2 = 166,889$ $\quad s = 12,91855\ldots$ $\quad s = 12,92$

$\gamma = 0,95$ непозната дисперзија

$\left(\bar{X}_n - c\frac{S}{\sqrt{n}}, \bar{X}_n + c\frac{S}{\sqrt{n}}\right)$

$c : \frac{1+\gamma}{2}$ t_{n-1} (TABELA 1)

$\frac{1+0,95}{2} = 0,975$ t_{149} $\quad c = 1,98$

$c \cdot \frac{S}{\sqrt{n}} = 1,98 \cdot \frac{12,92}{\sqrt{150}} = \frac{25,5816}{12,247} = 2,088|80\ldots = 2,089$

$(29,13 - 2,089 ; 29,13 + 2,089)$

$(27,041 ; 31,219)$

16. $X : N(m, \sigma^2)$ $\quad n = 25$

I_i	f_i	x_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
$[-0{,}5; 0{,}5)$	1	0	0	0	0
$[0{,}5; 1{,}5)$	4	1	4	1	4
$[1{,}5; 2{,}5)$	6	2	12	4	24
$[2{,}5; 3{,}5)$	12	3	36	9	108
$[3{,}5; 4{,}5)$	2	4	8	16	32
	25		60		168

(a) $\overline{X}_n = \frac{1}{n} \sum_i x_i f_i$

$\overline{X}_{25} = \frac{60}{25}$ $\qquad \boxed{\overline{X}_{25} = 2{,}4}$

$\overline{S}_n^2 = \frac{1}{n} \sum_i x_i^2 f_i - \overline{X}_n^2$

$\overline{S}_{25}^2 = \frac{1}{25} \cdot 168 - 2{,}4^2$

$= 6{,}72 - 5{,}76 = 0{,}96$

$\boxed{\overline{S}_{25}^2 = 0{,}96}$ $\qquad \overline{S}_{25} =$

$S^2 = \frac{1}{n-1}\left(\sum_i x_i^2 f_i - n \overline{X}_n^2\right)$

$s^2 = \frac{1}{24}(168 - 25 \cdot 5{,}76) = \frac{168 - 144}{24} = \frac{24}{24} = 1$

$\boxed{s^2 = 1}$ $\qquad \boxed{s = 1}$

(б) $\gamma = 0{,}95$ $\qquad \sigma^2$ nieznane

$\left(\overline{X}_n - c \cdot \frac{S}{\sqrt{n}}, \overline{X}_n + c \frac{S}{\sqrt{n}}\right)$

c : $\frac{1+\gamma}{2}$ t_{n-1} - TABELA 1

$\frac{1+\gamma}{2} = \frac{1+0{,}95}{2} = 0{,}975$ $\qquad t_{24} \longrightarrow c = 2{,}064$

$c \cdot \frac{s}{\sqrt{n}} = 2{,}064 \frac{1}{\sqrt{25}} = \frac{2{,}064}{5} = 0{,}4128$

$(2{,}4 - 0{,}4128;\ 2{,}4 + 0{,}4128)$

$\boxed{(1{,}9872;\ 2{,}8128}$

17.

I_i	f_i	x_i	$x_i f_i$	$x_i^2 f_i$
[210-250)	30	230	6900	1587000
[250-290)	70	270	18900	5103000
[290-330)	40	310	12400	3844000
[330-370)	10	350	3500	1225000
	150		41700	11759000

$n = 150$

(a) $\bar{x}_{150} = \frac{41700}{150} = 278$ $\boxed{\bar{x}_{150} = 278}$

$\bar{S}_n^2 = \frac{1}{n}\sum_i x_i^2 f_i - \bar{X}_n^2$

$\bar{s}_{150}^2 = \dots$

$S^2 = \frac{1}{n-1}\left(\sum_i x_i^2 f_i - n\bar{X}_n^2\right)$

$s^2 = \frac{1}{149}\left(11759000 \quad 11592600\right) = \frac{166400}{149} = 1116,7785$

$s^2 = 1116,7785$

$s = 33,4182\ldots$ $\boxed{s = 33,42}$

(b) $H_0\ (m = 270)$
$H_1\ (m \neq 270)$ $\alpha = 0,01$

(c) $H_0\ (m = 270)$
$H_0\ (m > 270)$

непозната дисперзија

t - test $\boxed{T = \frac{\bar{X}_n - m_0}{S}\sqrt{n}}$ (TABELA 1)

$t_{reg} = \frac{278 - 270}{33,42}\sqrt{150} = \frac{8}{33,42}\cdot\sqrt{150} = 0,239 \cdot 12,474 = 2,9812..$

$\boxed{t_{reg} = 2,98}$

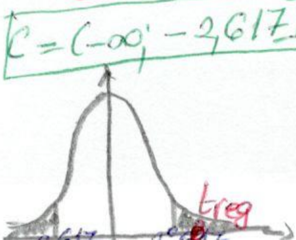
(b) $C = (-\infty, -c] \cup [c, +\infty)$

$c :\ 1 - \frac{\alpha}{2}$ t_{n-1}

$1 - \frac{\alpha}{2} = 1 - \frac{0,01}{2} = 1 - 0,005 = 0,995$
t_{149}

$c = 2,617$

$\boxed{C = (-\infty; -2,617] \cup [2,617; +\infty)}$



$t_{reg} \in C$

H_0 се одбацује

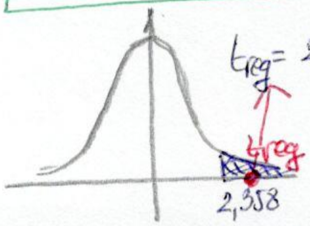
(c) $C = [c, +\infty)$

$c :\ 1 - \alpha$ t_{n-1}

$1 - \alpha = 0,99$ t_{149}

$c = 2,358$

$\boxed{C = [2,358; +\infty)}$



$t_{reg} = 2,98 > 2,358$

$t_{reg} \in C$

H_0 се одбацује

18. $n = 121$

x_i	f_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
1	7	7	1	7
2	11	22	4	44
3	16	48	9	144
4	17	68	16	272
5	26	130	25	650
6	31	186	36	1116
7	11	77	49	539
8	1	8	64	64
9	1	9	81	81
	121	555		2917

$$\overline{x}_{121} = \frac{555}{121} = 4,5867\ldots$$

$$\overline{x}_{121} = 4,59$$

$$s^2 = \frac{1}{n-1}\left(\sum_i x_i^2 f_i - n \cdot \overline{X}_n^2\right)$$

$$s^2 = \frac{1}{120}\left(2917 - 2549,2401\right)$$

$$s^2 = \frac{367,7599}{120} = 3,0646\ldots$$

$$s^2 = 3,06$$

$$s = 1,7492\ldots$$

$$s = 1,75$$

(b), (c) σ^2 nije poznato

t - test: $T = \dfrac{\overline{X}_n - \mu_0}{S}\sqrt{n}$ TABELA 1

$$t_{reg} = \frac{4,59 - 5}{1,75}\sqrt{121} = \frac{-0,41 \cdot 11}{1,75} = -\frac{4,51}{1,75} = -2,5771\ldots$$

$$t_{reg} = -2,577$$

(b) $H_0\ (m = 5)$

$H_1\ (m \neq 5)$ $\quad \alpha = 0,05$

$C = (-\infty, -c] \cup [c, +\infty)$

$c \therefore 1 - \frac{\alpha}{2} \quad t_{n-1}$

$1 - \frac{\alpha}{2} = 1 - \frac{0,05}{2} = 1 - 0,025 = 0,975$ $\quad t_{120}$

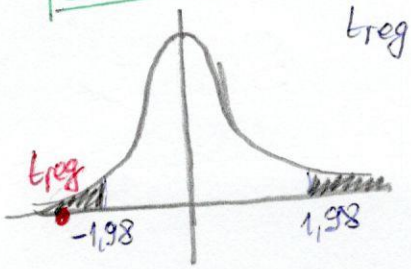
$c = 1,98$

$C = (-\infty; -1,98] \cup [1,98; +\infty)$

$t_{reg} = -2,577 < -1,98$

$t_{reg} \in C$

Ho ce odbaciti



(c) $H_0\ (m = 5)$

$H_1\ (m < 5)$

19.

$\sigma_0^2 = 1,8$

$n = 15$

$s^2 = 2,5$

$\alpha = 0,05$

$H_0 \ (\sigma^2 = 1,8)$

$H_1 \ (\sigma^2 > 1,8$

$$T = \frac{(n-1)S^2}{\sigma_0^2}$$

$$t_{reg} = \frac{14 \cdot 2,5}{1,8} = \frac{35}{1,8} = 19,444...$$

$t_{reg} = 19,44$

$C = [c_1 + \infty)$

$c : 1-\alpha \quad \chi^2_{n-1}$

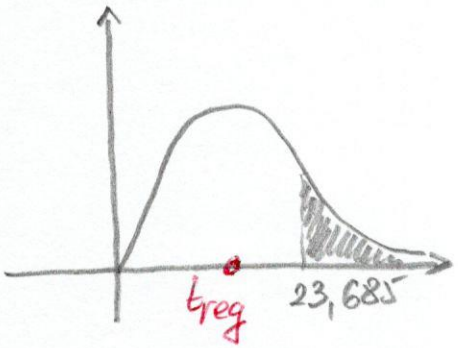
TABELA 4

$1-\alpha = 1-0,05 = 0,95$

χ^2_{14}

$c = 23,685$

$C = [23,685 ; +\infty)$



$t_{reg} = 19,44 < 23,685$

$t_{reg} \notin C$

Но се прихваща

20.

x_i	f_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
1	15	15	1	15
2	12	24	4	48
3	15	45	9	135
4	22	88	16	352
5	15	75	25	375
6	8	48	36	288
7	5	35	49	245
8	3	24	64	192
9	3	27	81	243
10	2	20	100	200
	100	401		2093

$n = 100$ $\quad X : N(m, 4)$

$H_0 (\sigma^2 = 4)$

$H_1 (\sigma^2 > 4 \quad \alpha = 0{,}01$

$\bar{x}_{100} = \frac{401}{100}$

$\bar{x}_{100} = 4{,}01$

$s^2 = \frac{1}{n-1}\left(\sum_i x_i^2 f_i - n \cdot \bar{X}_n^2\right)$

$s^2 = \frac{1}{99}(2093 - 1608{,}01) = \frac{484}{99}$

$= 4{,}8988\ldots$

$s^2 = 4{,}9$

$T = \frac{(n-1)S^2}{\sigma_0^2}$

$t_{reg} = \frac{99 \cdot 4{,}9}{4} = 485{,}1$

$t_{reg} = 121{,}275$

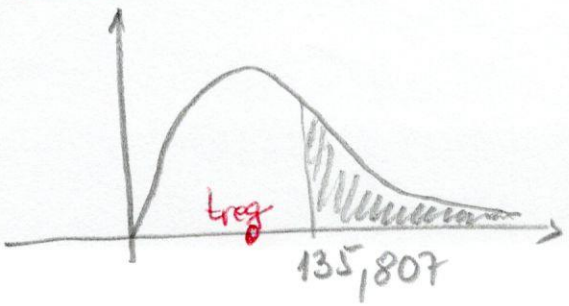
$C = [c_1, +\infty)$

$c : 1-\alpha \quad \chi^2_{n-1}$

$1-\alpha = 1 - 0{,}01 = 0{,}99; \quad \chi^2_{99}$

$c = 135{,}807$

$C = [135{,}807; +\infty)$



$t_{reg} = 121{,}275 < 135{,}807$

$t_{reg} \notin C$

H_0 се приема