6.6.2008 A

1) S_9 $f = (17)(28)(35649)$
$g = (38457)(16934) = (16984)(573)$

a) $f^{-1} = (17)(28)(39465)$
$g^{10} = (16984)^{10} \circ (573)^{10} = id \circ (5,7,3)$
$(f^9 \circ g^{-5})^{20} = (f^{-1} \circ g^{-5})^{20} = \left((17)(28)(39465) \circ (573)\right)^{20} =$
$= (28)^{20}(517946)^{20} = id \circ (517946)^2 = (574)(196)$

b) $f = (17)(28)(39)(34)(36)(35)$ SUDÁ
$g = (14)(18)(19)(16) \circ (53)(57)$ SUDÁ

c) $(h \circ (123))^2 \circ (h \circ (234))^2 = (1234)$
S S L
S ≠ NŘ

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2) $f = 4x^7 - 23x^5 + 17x^4 + 31x^3 - 49x^2 + 24x - 4$ racionální kořeny + rozklad nad $\mathbb{Z}$.
kořeny $\frac{p}{q}$ $p|4$ $q|4$ $\{\pm 1, \pm 2, \pm 4, \pm \frac{1}{2}, \pm \frac{1}{4}\}$

	4	0	-23	17	31	-49	24	-4	
(1)	4	4	-19	-2	29	-20	4	0	✓
(1)	4	8	-11	-13	16	-4	0		✓
(1)	4	12	1	-12	4	0			✓
1	4	16	17	5	9				✗
(-2)	4	4	-7	+2	0				✓
(-2)	4	-4	1	0					✓

$4x^2 - 4x + 1 = 0$
$x_{1,2} = \frac{4 \pm \sqrt{16-16}}{8} = \frac{1}{2}, \frac{1}{2}$
$f = 4(x-1)^3(x+2)^2(x-\frac{1}{2})^2 =$
$= (x-1)^3(x+2)^2(2x-1)(2x-1) =$
$= (x-1)^3(x+2)^2(2x-1)^2$ nad $\mathbb{Z}$

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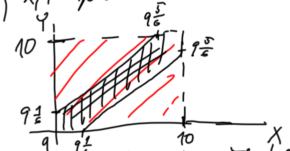
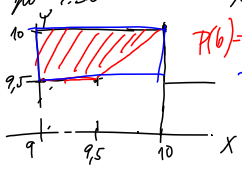
3) X, Y příchod mezi 9 a 10.



a) první příchozí nečeká déle než 10 minut.
X … $Y = X + \frac{1}{6}$ Y … $X = Y + \frac{1}{6}$
$P(a) = 1 - 2 \cdot \frac{\frac{5}{6}\cdot\frac{5}{6}}{2} = 1 - \frac{25}{36} = 0{,}305$

b) Y přijde jako 2., jestliže přijde po 9.30 $X < Y$



$P(b) = \frac{3/8}{1/2} = \frac{3}{4}$

5 25-16:30

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4) $n_1 = 22$, $M_1 = 34{,}23$, $s_1^2 = 1{,}76$
$n_2 = 10$, $M_2 = 35{,}73$, $s_2^2 = 1{,}81$

95% IS pro $\mu_1 - \mu_2$ ⇒ $\alpha = 0{,}05$

$M_1 - M_2 \pm s_*^2 \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}\, t_{1-\frac{\alpha}{2}}(n_1+n_2-2)$

$s_*^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} = 1{,}3323$

$H = 34{,}23 - 35{,}73 \oplus 1{,}3323 \sqrt{\frac{1}{22} + \frac{1}{10}} \cdot t_{0{,}975}(30)$
$D =$ — " — $\ominus$ — " —

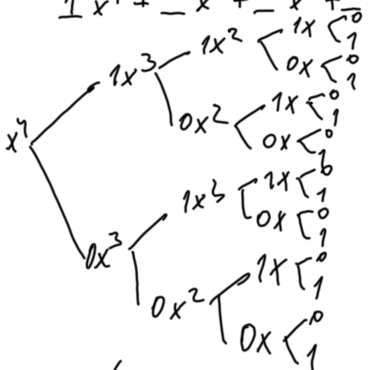
$t_{0{,}975}(30) = 2{,}0423$

$H = -0{,}4623$
$D = -2{,}5377$

5 25-16:48

POLYNOMY STUPNĚ 4 nad $\mathbb{Z}_2$

$1x^4 + \_x^3 + \_x^2 + \_x + \_$



jediný IRED nad $\mathbb{Z}_2$ 2. stupně
$f(x) = x^2 + x + 1$

5 25-16:58

$(\mathbb{Z}_n \times \mathbb{Z}_m, +)$
obecně není cyklická
ale pokud $(m,n) = 1$ pak je cyklická a lze ji generovat $(1,1)$

např. $(\mathbb{Z}_2 \times \mathbb{Z}_3, +) \cong \mathbb{Z}_6$
$(1,1), (0,2), (1,0), (0,1), (1,2), (0,0)$

5 25-17:04

TESTOVÁNÍ

$\mu = ?$ × $\mu > ?$

$\mu = 31$ × $\mu > 31$

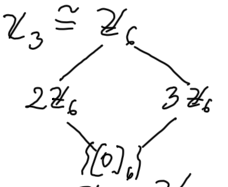
Jednostranný odhad

$u_{1-\frac{\alpha}{2}}$ $u_{1-\alpha}$

5 25-17:08

SVAZY PODGRUP

$\mathbb{Z}_2 \times \mathbb{Z}_3 \cong \mathbb{Z}_6$



$\mathbb{Z}_2 \times \mathbb{Z}_4$

(0,0)	(1,0)
(0,1)	(1,1)
(0,2)	(1,2)
(0,3)	(1,3)

$H = \{(0,0), (0,1), (0,2), (0,3)\}$

$G = \{(0,0), (1,0)\}$

$K = \{(0,0), (1,1), (0,2), (1,3)\}$

$L = \{(0,0), (0,2)\}$

$M = \{(0,0), (1,2)\}$

$N = ((0,0), (0,2), (1,2), (1,0))$

5 25-17:10

(173) $n = 16$ $M = 9{,}3\ k\Omega$

$\alpha = 0{,}05$ $H: \mu = 10\ k\Omega$

a) $\sigma^2 = 4\ k\Omega$

Sestrojíme 95% IS pro μ, (rozptyl známe) a podíváme se, zda $10 \in IS$, (pak potvrdíme nebo zamítáme)

$$\left(M - \frac{\sigma}{\sqrt{n}} u_{1-\frac{\alpha}{2}},\ M + \frac{\sigma}{\sqrt{n}} u_{1-\frac{\alpha}{2}}\right)$$

5 25-17:24

(138) $F_{XY}(x,y)$ známe-li $f_{XY}(x,y)$

$$\int_{-\infty}^{x}\left(\int_{-\infty}^{y} f_{XY}(u,v)\,dv\right)du$$

marginální distr. fci pro x:

$$\int_{-\infty}^{x}\left(\int_{-\infty}^{\infty} f_{XY}(u,v)\,dv\right)du$$

$$f_{X,Y} = \left(F_{XY}(x,y)\right)''_{xy} = \left(\frac{1}{4}\cdot 2x\cdot y^2\right)'_y = \frac{1}{2}x\cdot 2y = x\cdot y$$

jinak 0 $\langle 0,1\rangle \times \langle 0,2\rangle$

marginální pro x distr. fci

$$\int_{-\infty}^{x}\left(\int_{-\infty}^{\infty} u\cdot v\,dv\right)du = \int_0^x\left(\int_0^2 u\,v\,dv\right)du = \int_0^x\left[u\frac{v^2}{2}\right]_0^2 du = \int_0^x \frac{4u}{2}du = \int_0^x 2u\,du = \left[u^2\right]_0^x = x^2$$

5 25-17:35