Cafourek

1. a) F_3

(i)

+	0	1	2
0	0	1	2
1	1	2	0
2	2	0	1

(ii)

x	0	1	2
0	0	0	0
1	0	1	2
2	0	2	1

b) F_5

(i)

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3	4	0	1
3	3	4	0	1	2
4	4	0	1	2	3

(ii)

x	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	1	3
3	0	3	1	4	2
4	0	4	3	2	1

2.

x	0	1	2	3	4	5
0	0	0	0	0	0	0
1	0	1	2	3	4	5
2	0	2	4	0	2	4
3	0	3	0	3	0	3
4	0	4	2	0	4	2
5	0	5	4	3	2	1

→ 6 není prvočíslo

nepleší invertibilita

např. $4^{-1} \cdot (4 \cdot 3) = 4^{-1} \cdot 0$

$4 \cdot 3 = 0$

$3 \neq 0$

3.

a) $[(2+1) \cdot 4 - 4]^{-1}$

F_5 $12 - 4 = 8$ $\quad 8 \bmod 5 = 3$ $\quad 3^{-1} = 2$

b) F_7 $12 - 4 = 8$ $\quad 8 \bmod 7 = 1$ $\quad 1^{-1} = 1$

F_5 Cafourek

4. a) $3x+4=2 \quad /+1 \quad x \in F_5$

$3x=3 \quad /\cdot 3^{-1}$

$\downarrow$

$\cdot 2$

$x=1$

b) $4x+3y+1=4 \quad x \in F_5$

$x+3=4y \rightarrow x+3=4y \quad /+2$

$x=4y+2$

$4\cdot(4y+2)+3y+1=4$

$y+3+3y+1=4$

$4y+4=4 \quad /+1$

$4y=5 \quad /\cdot 4$

$y=0 \rightarrow x=4\cdot 0+2$

$x=2$

c) $2x+3y+3=2 \quad /+2 \quad x \in F_5$

$2x+3y=4 \quad /+2y$

$2x=2y+4 \quad /\cdot 3$

$x=y+2$

Cafourek

5. a) X
b) ✓ možná X
c) X
d) ✓
e) X
f) ✓

g) $x+2y=4$
$2x+y=1 \quad /\cdot(-2)$ ⊕
$-3x=2$
$x=-\frac{2}{3}$
$y=\frac{7}{3}$
X

h) $x+2y=8$
$2x+4y=8$
$\vec{u}(-2;1)$
$x=2-2t$
$y=1+1t$
✓

i) $x+2y=0$
$2x+4y=0$
$\vec{u}(-2;1)$
$x=2-2t$
$y=-1+1t$
✓

6. $\binom{1}{2} \in R^2$
$\left(\binom{2}{3},\binom{3}{5}\right)$

$\sum_{i=1}^{2} a_i \cdot \vec{x}_i = a_1 \cdot \vec{x}_1 + a_2 \cdot \vec{x}_2$

$\binom{1}{2} = a_1 \cdot \binom{2}{3} + a_2 \cdot \binom{3}{5}$

$2a_1 + 3a_2 = 1 \quad /\cdot(-3)$
$3a_1 + 5a_2 = 2 \quad /\cdot 2$ ⊕

$a_2 = 1 \Rightarrow a_1 = -1$

7. $p(x) = x^2+3x+2$
LP $\mathbb{R}[x]$ nad $\mathbb{R}$

a) $(x^2; x; 1)$ $\quad x^2+3x+2 = a_1 \cdot x^2 + a_2 \cdot x + a_3 \cdot 1$
$a_1=1, \; a_2=3, \; a_3=2$

b) $(x^2+1;\ 3x-1;\ 1)$
$x^2+3x+2 = (x^2+1)a_1 + (3x-1)a_2 + 1 \cdot a_3$
$a_1=1, \; a_2=1, \; a_3=2$