

Exercice 23

n1

$$3179x - 3077y = -102$$

$$3179 \cdot (-1) - 3077 \cdot (-1) = -102$$

$$3179 \cdot (-1) - 3077 \cdot (-1) = 3179x - 3077y$$

$$3179(-1-x) = 3077(-1-y)$$

$$(-1-y) = 3179k$$

$$3179(-1-x) = 3077 \cdot 3179k$$

$$-1-x = 3077k$$

$$1+x = -3077k$$

$$x = -3077k - 1$$

$$y = -3179k - 1$$

n2

$$\sqrt{220} = 14 + \sqrt{220} - 14 = 14 + \frac{1}{1(\sqrt{220} + 14)}$$

r	22610	39	29	10	9	1
q		579	1	2	1	9
x	1	0	1	-1	3	-4

$$x_3 = -4 \quad -4 \bmod 39 \equiv 35 \bmod 39$$

r	46410	19	12	7	5	2	1
q		2442	1	1	1	2	2
x	1	0	1	-1	2	-3	8

$$x_4 = 8$$

$$x = 25194 \cdot (29) \cdot 11 + 25935 \cdot (29) \cdot 28 + 25810 \cdot (35) \cdot 34 + 46410 \cdot (8 \cdot 4) \bmod 881790 = 33270276 \bmod 881790$$

$$\text{Answer: } 644048$$

$$\text{Verification } 644048 \equiv 11 \bmod 35$$

$$644048 \equiv 28 \bmod 39$$

$$644048 \equiv 3 \bmod 39$$

$$644048 \equiv 4 \bmod 19$$



$$+ 0,75 = 4x^0 + 3x^1 + 5x + 4x^2 + x^3 + \dots$$

$$\text{Ответ: } 2,25x^2 + 4,75x + 5,75$$

№6

$$x^4 - 5x^3 - 6x^2 + 7x - 2$$

Проверка

$$\begin{aligned} f(1) &= -5 \\ f(-1) &= -9 \\ f(2) &= -36 \\ f(-2) &= 16 \end{aligned}$$

$$\begin{array}{cccccc} 1 & -5 & -6 & 7 & -2 & \end{array}$$

$$\begin{array}{cccccc} 1 & 1 & -4 & -10 & -3 & -5 \end{array}$$

$$\begin{array}{cccccc} -1 & 1 & -6 & 0 & 7 & -9 \end{array}$$

$$\begin{array}{cccccc} 2 & 1 & -3 & -12 & -17 & -36 \end{array}$$

$$\begin{array}{cccccc} -2 & 1 & -7 & 8 & -9 & 16 \end{array}$$

Ответ: рациональных корней нет.

$$+ 225x^2 + 475x +$$

$$4x + 142 = 414$$

$$4x + 62 = 154$$

$$4x = 154 - 62$$

$$4x = 92$$

$$x = 23$$

$$x = 35$$

$$f(1) = -5$$

$$f(-1) = -9$$

$$f(2) = -36$$

$$f(-2) = 16$$

$$4 \cdot 35 + 142 = 414 - 6 - \text{мной}$$

$$4 \cdot 23 + 62 = 154 - 10 - \text{мной}$$

$$210$$

$$142 = 2 + 24 + 36 = 62$$

$$210$$

$$414 = 4 + 6 + 144 = 154$$

$$\begin{array}{r} \overline{23} \overline{) 6} \\ \underline{18} \phantom{0} \\ 5 \end{array}$$

$$\begin{array}{cccccc}
 r & 12 & 762 & 1 & 3 & 1 & 6 \\
 q & & 0 & 1 & -1 & 4 & -5 \\
 x & 1 & & & & & \\
 x_2 = -5 & & & & & & 
 \end{array}$$

$$-5 \bmod 34 \equiv 29 \bmod 34$$

28

$$x = \frac{61}{65} \bmod 94$$

$$65x = 61 \bmod 94$$

$$65x - 94y = 61 \quad y' = y$$

$$65x + 94y' = 61$$

$$\text{gcd}(65, 94) = 1$$

$$\begin{array}{cccccc}
 r & 65 & 94 & 65 & 29 & 7 & 4 & 0 \\
 q & & 0 & 1 & 2 & 4 & 7 & \\
 x & 1 & 0 & 1 & -1 & 3 & -13 & 
 \end{array}$$

$$x = -13 \cdot \frac{61}{1} + \frac{94}{1} k = 793 + 94k$$

$$x = 793 \bmod 94 = 41$$

Answer: 41



№ 10

$$\begin{array}{r|l}
 4x^5 + 3x^4 + 3x^3 + 4x^2 + x + 4 & 2x^3 + x^2 + 3x + 1 \\
 \hline
 4x^5 + 2x^4 + 6x^3 + 2x^2 & \\
 \hline
 x^4 - 3x^3 + 2x^2 + x + 4 & \\
 x^4 + \frac{1}{2}x^3 + 1,5x^2 + \frac{1}{2}x & \\
 \hline
 -2,5x^3 + 0,5x^2 + \frac{1}{2}x + 4 & \\
 -2,5x^3 - 1,25x^2 - 3,75x + 1,25 & \\
 \hline
 2,25x^2 + 4,75x + 5,75 & 
 \end{array}$$

Проверка:  $(2x^2 + \frac{1}{2}x - 1\frac{1}{4}) \cdot (2x^3 + x^2 + 3x + 1) + 2,25x^2 + 4,75x + 5,75 = 4x^5 + 3x^4 + 3x^3 + 4x^2 + x + 4$

Ответ:  $2,25x^2 + 4,75x + 5,75$

№ 6

$$x^4 - 5x^3 - 6x^2 + 7x - 2$$

1	-5	-6	7	-2	
1	1	-4	-10	-3	-5
-1	1	-6	0	7	-9
2	1	-3	-17	-12	20

Проверка

$$\begin{aligned}
 f(1) &= -5 \\
 f(-1) &= -9 \\
 f(2) &= -36 \\
 f(-2) &= 10
 \end{aligned}$$

n3

$$\frac{303}{214} = 4 + \frac{47}{214} = 4 + \frac{1}{\frac{214}{47}} = 4 + \frac{1}{4 + \frac{26}{47}} = 4 + \frac{1}{4 + \frac{1}{1 + \frac{21}{26}}} =$$

$$= 4 + \frac{1}{4 + \frac{1}{1 + \frac{1}{1 + \frac{5}{21}}}} = 4 + \frac{1}{4 + \frac{1}{1 + \frac{1}{4 + \frac{1}{1 + \frac{1}{5}}}}}$$

Answer: [4, 4, 1, 1, 4, 5]

n3

$$x \equiv 11 \pmod{35}$$

$$x \equiv 28 \pmod{34}$$

$$x \equiv 3 \pmod{39}$$

$$x \equiv 4 \pmod{19}$$

$$x \equiv 35 \pmod{21}$$



r	25	-194	35	29	6	5	1	0
q			719	1	4	1	5	
x	1		0	1	-1	5	-6	

$$x_1 = -6$$

$$-6 \bmod 35 \equiv 29 \bmod 35$$

r	25	935	34	27	7	6	1
q			762	1	3	1	6
x	1		0	1	-1	4	-5

$$x_2 = -5$$

$$-5 \bmod 34 \equiv 29 \bmod 34$$

28



$$x \equiv 11 \pmod{35}$$

$$x \equiv 28 \pmod{34}$$

$$x \equiv 3 \pmod{39}$$

$$x \equiv 4 \pmod{19}$$

$$M = 35 \cdot 34 \cdot 39 \cdot 19 = 46410 \cdot 19 = 881790$$

$$M_1 = 34 \cdot 39 \cdot 19 = 25194$$

$$M_2 = 35 \cdot 39 \cdot 19 = 25935$$

$$M_3 = 35 \cdot 34 \cdot 19 = 22610$$

$$M_4 = 35 \cdot 34 \cdot 39 = 46410$$





$$\frac{24}{\sqrt{220}+14}$$

N2

$$\sqrt{220} = 14 + \sqrt{220} - 14 = 14 + \frac{1}{\frac{1(\sqrt{220}+14)}{(\sqrt{220}-14)(\sqrt{220}+14)}} =$$

$$\frac{1}{1} = 1$$

$$= 14 + \frac{1}{\frac{\sqrt{220}+14}{220-196}} = 14 + \frac{1}{\frac{\sqrt{220}+14}{24}} = 14 + \frac{1}{\frac{28+\sqrt{220}}{24}} = 14 + \frac{1}{1+\frac{1}{24\sqrt{220}}}$$

$$+5\sqrt{220}$$

$$= 14 + \frac{1}{1 + \frac{1}{124(\sqrt{220}+10)}} = 14 + \frac{1}{4 + \frac{1}{\frac{\sqrt{220}+10}{5}}} = 14 + \frac{1}{4 + \frac{1}{\frac{24+\sqrt{220}}{5}}}$$

$$= 14 + \frac{1}{4 + \frac{1}{4 + \frac{\sqrt{220}}{5}}} = 14 + \frac{1}{4 + \frac{1}{4 + \frac{\sqrt{220}}{5}}} =$$