№10

$$
\begin{array}{l|l}
4x^5+3x^4+3x^3+4x^2+x+4 & 2x^3+x^2+3x+1 \\
-\ 4x^5+2x^4+\cancel{2}x^3+2x^2\ \cancel{2x} & \hline 2x^2+\cancel{4}3x+2 \\
\hline
\quad \cancel{4}x^4+2x^3+2x^2+x+4 & \\
\quad -\ x^4+3x^3+4x^2+3x & \\
\hline
\qquad 4x^3+3x^2+3x+4 & \\
\qquad -\ 4x^3+2x^2+x+2 & \\
\hline
\qquad\quad x^2+2x+2 &
\end{array}
$$

ответ: x^2+2x+2

1	$x=-3077k-1$ $y=-3179k-1$
2	[4; 1; 4; 1; 4]
3	644046
4	44
5	—
6	рациональных корней нет
7	414_6 или 154_{10}
8	41
9	[4, 4, 1, 1, 4, 5]
10	x^2+2x+2

Вариант 23

№1

$3179x - 3077y = -102$

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

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

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

$(-1-y) = 3179k$

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

$-1-x = 3077k$

$1+x = -3077k$

$x = -3077k - 1$

$y = -3179k - 1$

№2

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

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

$x_4 = 8$

$x = (25194 \cdot 29 \cdot 11 + 25935 \cdot 29 \cdot 28 + 22610 \cdot 35 \cdot 3 +$

$+ 46410 \cdot 8 \cdot 4) \bmod 881790 = 33270276 \bmod 881790$

Проверка $644046 \equiv 11 \bmod 35$

$644046 \equiv 28 \bmod 34$

$644046 \equiv 3 \bmod 39$

$644046 \equiv 4 \bmod 19$

Ответ: 644046

$+5,75 = 4x^3+3x^2+3x+4x^2...$

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	-12	-17	-36
-2	1	-7	8	-9	16

Проверка $f(1)=-5$

$f(-1)=-9$

$f(2)=-36$

$f(-2)=16$

Ответ: рациональных корней нет.

$) + 2\cancel{2}{}^5x^2 + \cancel{9}7{}^5x +$

$f(1) = -5$

$f(-1) = -3$

$f(2) = -36$

$f(-2) = 16$

$4x + 142 = 414$

$4x + 62 = 154$

$4x = 154 - 62$

$4x = 92$

$x_{10} = 23$

$x_6 = 35$

$4 \cdot 35 + 142 = 414$ - 6 - ичной

$4 \cdot 23 + 62 = 154$ - 10 - ичной

$\overset{210}{142} = 2 + 24 + 36 = 62$

$\overset{210}{414} = 4 + 6 + 144 = 154$

$23 : 6 = 3$, $23 - 18 = 5$

r	762	1	3	1	6
q	0	1	−1	4	−5
x	1				

$x_2 = -5$ $\quad -5 \bmod 34 \equiv 29 \bmod 34$

№8

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

$65x = 61 \bmod 94$

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

$65x + 94y' = 61$

НОД $(65; 94) = 1$

r	65	94	65	29	7	1	0
q		0	1	2	4	7
x	1	0	1	−1	3	−13

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

$x = -793 \bmod 94 = 41$

Ответ: 41

№ 10

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

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

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	-12	-17	-36

Проверка $f(1)=-5$

$f(-1)=-9$

$f(2)=-36$

$f(-2)=$ [illegible]

№ 9

$$\frac{903}{214} = 4+\frac{47}{214} = 4+\frac{1}{\frac{214}{47}} = 4+\frac{1}{4+\frac{26}{47}} = 4+\frac{1}{4+\frac{1}{1+\frac{21}{26}}} =$$

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

Ответ: [4, 4, 1, 1, 4, 5]

№ 3

$\equiv 11 \bmod 35$

$\equiv 28 \bmod 34$

$3 \bmod 39$

$4 \bmod 19$

35 21

r	25194	35	29	6	5	1	0
q		719	1	4	1	5	
x	1	0	1	−1	5	−6	

$x_1 = -6$ $\quad -6 \bmod 35 \equiv 29 \bmod 35$

r	25935	34	27	7	6	1
q		762	1	3	1	6
x	1	0	1	−1	4	−5

$x_2 = -5$ $\quad -5 \bmod 34 \equiv 29 \bmod 34$

№8

№ 3

$x \equiv 11 \mod 35$

$x \equiv 28 \mod 34$

$x \equiv 3 \mod 39$

$x \equiv 4 \mod 19$

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

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

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

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

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

$$14+\cfrac{1}{1+\cfrac{1}{4+\cfrac{4+\{\sqrt{220}\}}{5}}}=14+\cfrac{1}{1+\cfrac{1}{4+\cfrac{18(\sqrt{220}+10)}{\cancel{420}\ 24}}}=14+\cfrac{1}{1+\cfrac{1}{4+\cfrac{24}{\{\sqrt{220}\}+24}}}=$$

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

Ответ: $[14;\overline{1,4,1}]$

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

1

1

1

1

$+\{\sqrt{220}\}$

№2

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

$$= 14 + \frac{1}{\frac{\sqrt{220}+14}{220-196}} = 14 + \frac{1}{\frac{\sqrt{220}+14}{24}} = 14 + \frac{1}{\frac{28+\{\sqrt{220}\}}{24}} = 14 + \frac{1}{1+\frac{1}{\frac{24}{4+\{\sqrt{220}\}}}}$$

$$= 14 + \frac{1}{1+\frac{1}{\frac{24(\sqrt{220}+10)}{120}}} = 14 + \frac{1}{1+\frac{1}{\frac{\sqrt{220}+10}{5}}} = 14 + \frac{1}{1+\frac{1}{\frac{24+\{\sqrt{220}\}}{5}}} =$$

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

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

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

№ 24

$$11^{21^{79}} \bmod 59$$

$$k = 21^{79} \rightarrow 11^{k} \bmod 59$$

$$\varphi(59) = 58$$

$$k = 21^{79} = 58n + b$$

$$b \equiv 21^{79} \bmod 58$$

$$\varphi(58) = \varphi(2) \cdot \varphi(29) = 28$$

$$b \equiv 21^{28 \cdot 2 + 23} \bmod 58 \Rightarrow 21^{23} \bmod 58 \rightarrow$$

$a = 21$, $m = 23$, $k = 58$

$23_{10} = 10111$

a_i	c	c^2	$c^2 a^{a_i}$	$c^2 a^{a_i} \bmod k$
1	1	1	21	21
0	21	441	441	35
1	35	1225	25725	313
1	313		20187	55
1	55	3025	63525	15

$b \equiv 15 \cdot \bmod 58$

$\cancel{2}1^{15} \bmod 59 \rightarrow a = \cancel{11}, m = 15, k = 59$

$15_{10} = 11\cancel{0}1_2$

a_i	c	c^2	$c^2 a^{a_i}$	$c^2 a^{a_i} \bmod k$
1	1	1	$\cancel{2}1$	11
$\cancel{0}$	11	121	1331	33
1	33	1089	11979	$2\cancel{2}$
1	2	4	$\cancel{4}4$	44

$\cancel{2}1^{21^{79^2}} \equiv \cancel{4}\cancel{4} \bmod 59$

Ответ:

№6

$x^4 - 5x^3 \ldots$