

Задача № 1, 0362

15-го вопроса.

1. $x = -639 - 753k$

$y = -522 - 725k$

2. $[19, 5, 2, 5, 38]$

3. 38281

4. 22

5. $2x^4 + 4x^3 - 2x^2 - 2x - 3$

6. Корней нет

7. $43_5 = 23_{10}$

8. 65

9. $[2, 2, 7, 2, 12]$

10. $x^2 + 3x + 4$

$$1) \quad 2725x - 2607y = -753$$

$$2607 = 2725 \cdot 1 + 476$$

$$2725 = 476 \cdot 4 + 221$$

$$476 = 221 \cdot 2 + 34$$

$$221 = 34 \cdot 6 + 17 \quad - \text{max}$$

$$34 = 17 \cdot 2 + 0$$

$$725x - 753y = -9$$

$$753 = 725 \cdot 1 + 28$$

$$725 = 28 \cdot 4 + 13$$

$$28 = 13 \cdot 2 + 2$$

$$13 = 2 \cdot 6 + 1$$

$$\underline{1} = 13 - 2 \cdot 6 = 13 - (28 - 13 \cdot 2) \cdot 6 =$$

$$= 13 \cdot 13 - 28 \cdot 6 = (725 - 28 \cdot 4) \cdot 13 - 28 \cdot 6 = 725 \cdot 13 -$$

$$- 28 \cdot 58 = 725 \cdot 13 - (753 - 725 \cdot 1) \cdot 58 = 725 \cdot 31 - 753 \cdot 58$$

$$725 \cdot 31 - 9 - 753 \cdot 58 - 9 = -9$$

$$725 \cdot -639 - 753 \cdot -522 = -9$$

$$\underline{x_1 = -639} \quad \underline{y_1 = -522}$$

$$x_1 = -639 \Rightarrow x = x_1 + \frac{b}{a} \cdot k = -639 + \frac{1}{2} \cdot k = -639 + 753k$$

$$y_1 = -522 \Rightarrow y = y_1 + \frac{a}{b} \cdot k = -522 + 725k$$

$$2725 \cdot (-639 - 753K) - 2601 \cdot (-522 - 725K) = -153$$

1. $n_{pole, max}$

$$2) \sqrt{368} =$$

$$h^2 \leq 368 < (h+1)^2$$

$$h = \left(\frac{368 + \frac{368}{368}}{2} \right) = \frac{369}{2} = 784$$

$$h = \left(\frac{784 + \frac{368}{784}}{2} \right) = \frac{786}{2} = 93$$

$$h = \left(\frac{93 + \frac{368}{93}}{2} \right) = \frac{96}{2} = 48$$

$$h = \left(\frac{48 + \frac{368}{48}}{2} \right) = \frac{55}{2} = 27$$

$$h = \left(\frac{27 + \frac{368}{27}}{2} \right) = \frac{40}{2} = 20$$

$$h = \left(\frac{20 + \frac{368}{20}}{2} \right) = \frac{38}{2} = 19$$

$$h = \left(\frac{19 + \frac{368}{19}}{2} \right) = \frac{38}{2} = 19$$

~~19~~

$$\sqrt{368} = 19 + (\sqrt{368} - 19) = 19 + \frac{1}{\left(\frac{1}{\sqrt{368} - 19}\right)} = 19 + \frac{1}{\left(\frac{\sqrt{368} + 19}{2}\right)} =$$

$$= 19 + \frac{1}{\frac{38 + \sqrt{368} - 19}{2}} = 19 + \frac{1}{5 + \frac{\sqrt{368} - 19}{2}} = 19 + \frac{1}{5 + \frac{2(\sqrt{368} + 19)}{112}} =$$

$$= 19 + \frac{1}{5 + \frac{1}{\left(\frac{\sqrt{368} + 19}{16}\right)}} = 19 + \frac{1}{5 + \frac{1}{\frac{35 + \sqrt{368} - 19}{16}}} = 19 + \frac{1}{5 + \frac{1}{2 + \frac{\sqrt{368} - 19}{16}}} =$$

$$= 19 + \frac{1}{5 + \frac{1}{2 + \frac{1}{\left(\frac{16(\sqrt{368} + 19)}{112}\right)}}} = 19 + \frac{1}{5 + \frac{1}{2 + \frac{1}{\frac{35 + \sqrt{368} - 19}{9}}}} =$$

$$= 19 + \frac{1}{5 + \frac{1}{2 + \frac{1}{5 + \frac{\sqrt{368} - 19}{9}}}} = 19 + \frac{1}{5 + \frac{1}{2 + \frac{1}{5 + \frac{1}{\left(\frac{2(\sqrt{368} - 19)}{7}\right)}}}} =$$

$$= 19 + \frac{1}{5 + \frac{1}{2 + \frac{1}{5 + \frac{1}{38 + \sqrt{368} - 19}}}} =$$

38 = 19 · 2 ⇒ Конечный член — рациональный.

[19; 5; 2; 5; 38]

$$3) x \equiv 73 \pmod{74};$$

$$x \equiv 70 \pmod{73};$$

$$x \equiv 3 \pmod{19};$$

$$x \equiv 16 \pmod{29};$$

$$M = 74 \cdot 73 \cdot 19 \cdot 29 = 100282$$

$$M_1 = 7163$$

$$M_2 = 7714$$

$$M_3 = 5278$$

$$M_4 = 3458$$

$$1. \text{ } 7163x = 7 \pmod{74}$$

$$7163x - 74y = 7$$

$$i \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

$$r \quad 7163 \quad 74 \quad 9 \quad 5 \quad 4 \quad 1$$

$$q \quad \quad \quad 5 \quad 1 \quad 1 \quad 1$$

$$x \quad 1 \quad 0 \quad 1 \quad -1 \quad 2 \quad -83 = x_1$$

$$y \quad 0 \quad 1 \quad \quad \quad \quad \quad$$

$$x_1 = -83 \pmod{74} = 91 \pmod{74}$$

$$\text{II. } 2274x - 75y = 1.$$

$$\begin{array}{c} \text{I} \\ \text{II} \end{array} \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 \\ 1 & 0 & 1 & 2 & 3 & 4 \end{array}$$

$$\text{V } 7714 \quad 15 \quad 5 \quad 3 \quad 2 \quad 1$$

$$\text{Q } 593 \quad 2 \quad 1 \quad 1$$

$$x \quad 1 \quad 0 \quad 1 \quad -2 \quad 3 \quad -5 = x_2 \Rightarrow x_2 = 38$$

$$\text{III } 5278x - 75y = 1.$$

$$\begin{array}{c} \text{I} \\ \text{II} \end{array} \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 \\ 1 & 0 & 1 & 2 & 3 & 4 \end{array}$$

$$\text{V } 5278 \quad 19 \quad 15 \quad 4 \quad 3 \quad 1$$

$$\text{Q } 272 \quad 1 \quad 3 \quad 21$$

$$x \quad 1 \quad 0 \quad 1 \quad -1 \quad 4 \quad -35 = x_3 \Rightarrow x_3 = 19$$

$$\text{IV } 3458x - 29y = 1.$$

$$\begin{array}{c} \text{I} \\ \text{II} \end{array} \begin{array}{cccc} 0 & 1 & 2 \\ 1 & 0 & 1 & 2 \end{array}$$

$$\text{V } 3458 \quad 298 \quad 7 \quad 1$$

$$\text{Q } 119 \quad 4$$

$$x \quad 1 \quad 0 \quad 1 \quad -9 = x_4 \Rightarrow x_4 = 25$$

$$x = (7163 \cdot 11 \cdot 15 + 7714 \cdot 8 \cdot 10 + 5278 \cdot 74 \cdot 3 + 3458 \cdot 25 \cdot 4)$$

$$x = 100282$$

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$$x = 100282$$

$$37281 = 14 \cdot 2662 + 13$$

$$37281 = 13 \cdot 2867 + 10$$

$$37281 = 19 \cdot 1962 + 3$$

$$37281 = 29 \cdot 1285 + 16$$

} гипотеза.

$$4) 17^{51} \bmod 45$$

$$K = 17^{51}$$

$$\varphi(45) = \varphi(5) \cdot \varphi(9) = 4 \cdot 6 = 24$$

$$K = 17^{24n+6} = 17^6 \bmod 45$$

$$\varphi(24) = \varphi(2^3) \cdot \varphi(3) = 8$$

$$17^{24+3} \bmod 24 = 17^3 \bmod 24$$

$$8 = 17^3 \bmod 24 = 17 \bmod 24$$

$$I = 7^{74} \bmod 45$$

$$17_{10} = 10001_2$$

$$1 \quad 1 \quad 1 \quad 7 \quad 7$$

$$0 \quad 7 \quad 49 \quad 49 \quad 49$$

$$0 \quad 4 \quad 16 \quad 16 \quad 16$$

$$0 \quad 16 \quad 256 \quad 256 \quad 37$$

$$1 \quad 7 \quad 51 \quad 6327 \quad 22$$

$$17^{51} \bmod 45 = 22 \bmod 45$$

$$p(2) = 49$$

$$p(-1) = -5$$

$$p(-3) = 39$$

$$p(-2) = -7$$

$$p(1) = -1$$

$$f(x) = \frac{(x+1)(x+3)(x+2)(x-1)}{3 \cdot 5 \cdot 4 \cdot 7} \cdot 49 + \frac{(x-2)(x+3)(x+2)(x-1)}{-3 \cdot 2 \cdot 4 \cdot 2}$$

$$+ \frac{-5 + (x-2)(x+1)(x+2)(x-1)}{-5 \cdot -2 \cdot -7 \cdot -4} \cdot 39 + \frac{(x-2)(x+1)(x+3)(x-1)}{-4 \cdot -7 \cdot 7 \cdot -3}$$

$$+ \frac{-7 + (x-2)(x+1)(x+3)(x+2)}{-7 \cdot 2 \cdot 4 \cdot 3} \cdot -1 = \frac{49}{60} (x+1)(x+3)(x+2)(x-1) +$$

$$+ \frac{5}{12} (x-2)(x+3)(x+2)(x-1) + \frac{39}{40} (x-2)(x+1)(x+2)(x-1) +$$

$$+ \frac{7}{24} (x-2)(x+1)(x+3)(x-1) + \frac{1}{24} (x-2)(x+1)(x+3)(x+2) =$$

$$= (x-2)(x+3) \left(-\frac{5}{12} (x+2)(x-1) + \frac{7}{12} (x+1)(x-1) + \frac{1}{24} (x+1)(x+2) \right) +$$

$$+ 49 (x+1)(x+2)(x-1) \left(\frac{49}{60} (x+3) + \frac{39}{40} (x-2) \right) = 2x^4 + 4x^3 - 2x^2 -$$

$$-2x - 3 \Rightarrow \begin{array}{cccccc} & 2 & 4 & -2 & -2 & -3 \\ 2 & 2 & 8 & 14 & 26 & 49 \\ -1 & 2 & 2 & -4 & 2 & -5 \\ -3 & 2 & -2 & 4 & -14 & 39 \\ -2 & 2 & 0 & -2 & 2 & -7 \\ 1 & 2 & 6 & 4 & 2 & -1 \end{array} \quad \left. \vphantom{\begin{array}{cccccc} 2 & 2 & 8 & 14 & 26 & 49 \\ -1 & 2 & 2 & -4 & 2 & -5 \\ -3 & 2 & -2 & 4 & -14 & 39 \\ -2 & 2 & 0 & -2 & 2 & -7 \\ 1 & 2 & 6 & 4 & 2 & -1 \end{array}} \right\} \text{hyperbolic.}$$

$$6) x^4 - 5x^3 - 6x^2 + 3x - 2 = 0$$

$$p = \frac{-2 \pm 1}{2} = -\frac{1}{2}$$

$$x \quad 1 \quad -5 \quad -6 \quad 3 \quad -2$$

$$1 \quad 1 \quad -4 \quad -10 \quad -3 \quad -5$$

$$-1 \quad 1 \quad -6 \quad 0 \quad 7 \quad -9$$

$$2 \quad 1 \quad -3 \quad -12 \quad -18 \quad -36$$

$$-2 \quad 1 \quad -7 \quad -9 \quad 16$$

Корней нет

$$2) 212_5 = 415_5$$

$$I) 222_5 = 2 \cdot 5^0 + 2 \cdot 5^1 + 2 \cdot 5^2 = 62_{10}$$

$$413_5 = 3 \cdot 5^0 + 1 \cdot 5 + 4 \cdot 5^2 = 108_{10}$$

$$2x_{10} + 62_{10} = 108_{10}$$

$$2x = 23_{10} = 43_5$$

$$\begin{array}{r} 23 \mid 5 \\ 20 \mid 4 \\ \hline 3 \mid 5 \\ 5 \mid 0 \end{array}$$

$$\begin{array}{r} 741 \mid 2x \\ 13 \mid 43_5 \\ \hline 11 \mid \\ \hline 0 \end{array}$$

$$x = 43_5 = 4 \cdot 5 + 3 = 23_{10}$$

$$II) \begin{array}{r} 413 \\ - 222 \\ \hline 191 \end{array}$$

$$22 \cdot 10 \bmod 71$$

$$22 - 3 \cdot 9 = 10$$

$$9 = 22 \cdot 3 + 5$$

$$5 = 22 \cdot 4 + 2$$

$$2 = 22 \cdot 2 + 1$$

$$1 = 5 - 2 \cdot 2 = 5 - (22 - 5 \cdot 4) \cdot 2 = 5 \cdot 9 - 22 \cdot 2 =$$

$$= (5 - 22 \cdot 3) \cdot 9 - 22 \cdot 2 = 45 - 22 \cdot 20$$

$$22 \cdot 20 \cdot 10 - 45 \cdot 10 = 10$$

$$22 \cdot 200 - 45 \cdot 90 = 10$$

$$-290 \equiv 65 \bmod 71$$

$$x = x_1 + \frac{b}{a} \cdot k = x - 290 - 71k \quad \text{Omskr: 65}$$

$$y = y_1 + \frac{a}{b} \cdot k = -90 - 22k$$

$$9) \frac{71}{30} = 2 + \frac{11}{30} = 2 + \frac{1}{\left(\frac{30}{11}\right)} = 2 + \frac{1}{2 + \frac{8}{11}} = 2 + \frac{1}{2 + \frac{1}{\left(\frac{11}{8}\right)}} =$$

$$= 2 + \frac{1}{2 + \frac{1}{1 + \frac{3}{8}}} = 2 + \frac{1}{2 + \frac{1}{7 + \frac{1}{\left(\frac{8}{3}\right)}}} = 2 + \frac{1}{2 + \frac{1}{7 + \frac{1}{2 + \frac{2}{3}}}} =$$

$$= 2 + \frac{1}{2 + \frac{1}{7 + \frac{1}{2 + \frac{1}{\left(\frac{3}{2}\right)}}}} = 2 + \frac{1}{2 + \frac{1}{1 + \frac{1}{2 + \frac{1}{1 + \frac{1}{2}}}}} \Rightarrow [2, 2, 1, 2, 1, 2]$$

$$\text{II. } 71 = 30 \cdot 2 + 11$$

$$30 = 11 \cdot 2 + 8$$

$$11 = 8 \cdot 1 + 3$$

$$8 = 3 \cdot 2 + 2$$

$$3 = 2 \cdot 1 + 1$$

$$2 = 1 \cdot 2 + 0 \Rightarrow [2, 2, 1, 2, 1, 2]$$

$$70 \cdot \cancel{6x^5 + 40x^3 + 6x^2 + 6x + 5} \cdot \cancel{6x^2 + 5x + 6}$$

$$\begin{array}{r} 6x^5 + 0x^4 + 4x^3 + 6x^2 + 6x + 5 \\ - (6x^5 + 36x^4 + 36x^3 + 36x^2) \\ \hline -35x^4 + 3x^3 + 9x^2 + 6x + 5 \\ - (-5x^4 + 25x^3 + 30x^2 + 30x) \\ \hline -6x^3 + 3x^2 + 4x + 5 \\ - (6x^3 + 50x^2 + 36x + 36) \\ \hline x^2 + 3x + 4 \end{array}$$

$$6x^5 + 4x^3 + 6x^2 + 6x + 5 = (x^3 + 5x^2 + 6x + 6)(6x^2 + 5x + 6) + x^2 + 3x + 4$$

$$\begin{aligned} \text{hpolynorm}! & ((x^3 + 5x^2 + 6x + 6)(6x^2 + 5x + 6) + x^2 + 3x + 4) \bmod 7 = \\ & \equiv (6x^5 + 55x^4 + 67x^3 + 37x^2 + 69x + 40) \bmod 7 = \\ & \equiv (6x^5 + 4x^3 + 6x^2 + 6x + 5) \bmod 7 \end{aligned}$$