

Ⓐ) биржайтын сүйлеме

Ⓐ) А) $(2013)_{-5} = (\quad)_{10}$

Некоторый способ

Б) $(214)_{-5} = (\quad)_{10}$

$$(214)_{-5} = 2 \cdot (-5)^2 + 1 \cdot (-5) + 4 = 150 - 5 + 4 = \underline{\underline{49}}$$

В) $(1110110)_2 = (\quad)_{10} = (\quad)_8$

$$(1110110)_2 = 2^6 + 2^5 + 2^4 + 2^2 + 2 = 64 + 32 + 16 + 4 + 2 = \\ = \underline{\underline{118}}$$

$(118)_{10} = (\underline{\underline{116}})_8$

$$\begin{array}{r} 118 : 8 = 14 \\ \underline{8} \\ 38 \\ \underline{32} \\ 6 \end{array}$$

$$\begin{array}{r} 118 \\ 14 \\ \hline 6 \end{array} \quad \begin{array}{r} 1 \\ 1 \\ 0 \end{array}$$

Г) $(143.12)_8 = (\quad)_{10}$

$$(143.12)_8 = 8^2 + 4 \cdot 8 + 3 + 8^{-1} + 2 \cdot 8^{-2} = \\ = 64 + 32 + 3 + 0,125 + 0,03125 = \\ = \underline{\underline{99.15625}}$$

$$1) (1A2C.48)_{16} = (\quad)_{10}$$

$$16^3 + 10 \cdot 16^2 + 2 \cdot 16 + 12 + 4 \cdot 16^{-1} + 8 \cdot 16^{-2} =$$

$$= 4096 + 2560 + 32 + 12 + 0.25 + 0.03125 =$$

$$= \underline{\underline{6700.28125}}$$

$$2) (110.32)_4 = (\quad)_{10}$$

$$4^2 + 4 + 34^{-1} + 2 \cdot 4^{-2} = 16 + 4 + 0.25 + 0.125 =$$

$$= \underline{\underline{20.875}}$$

$$e) (1011010010)_2 = (\quad)_{10}$$

$$2^9 + 2^7 + 2^6 + 2^4 + 2 = 512 + 128 + 64 + 16 + 2 = \underline{\underline{722}}$$

$$III) (233.12)_8 = (\quad)_{10}$$

$$2 \cdot 8^2 + 3 \cdot 8 + 3 + 8^{-1} + 2 \cdot 8^{-2} = 128 + 24 + 3 + 0.125 + 0.03125$$

$$= \underline{\underline{155.156125}}$$

$$3) (2C)_{16} = (\quad)_{10}$$

$$2 \cdot 16 + 12 = 32 + 12 = \underline{\underline{44}}$$

$$4) (FFFF)_{16} = (?)_{10}$$

$$(100000)_{16} = 16^4$$

$$(FFFF)_{16} = 16^4 - 1 = 65536 - 1 = \underline{\underline{65535}}$$

$$j) (1(-1)100(-1))_{6t} = (?)_{10}$$

$$3^5 + (-1)3^4 + 3^3 + (-1) = 243 - 81 + 27 - 1 = \underline{\underline{188}}$$

$$k) (762.32)_{0.5} = (?)_{10}$$

$$7 \cdot (0.5)^2 + 6 \cdot 0.5 + 2 + 3 \cdot (0.5)^{-1} + 2 \cdot (0.5)^{-2} =$$

$$= 1.75 + 3 + 2 + 6 + 8 = \underline{\underline{20.75}}$$

$$n) (110101.11)_2 = (?)_{10}$$

$$2^5 + 2^4 + 2^2 + 1 + 2^{-1} + 2^{-2} = 32 + 16 + 4 + 1 + 0.5 + 0.25$$

$$= \underline{\underline{53.75}}$$

$$o) (10101.11)_{-2} = (?)_{10}$$

$$(-2)^5 + (-2)^4 + (-2)^2 + 1 + (-2)^{-1} + (-2)^{-2} =$$

$$= -32 + 16 + 4 + 1 - 0.5 + 0.25 = \underline{\underline{-11.25}}$$

$$u) (2A \cdot B)_{10} = (\quad)_{10}$$

$$= ((2 \cdot 16 + 10) \cdot 16 + 1) \cdot 16 + 11 = (42 \cdot 16 + 1) \cdot 16 + 11 =$$

$$= 673 \cdot 16 + 11 = 10768 + 11 = \underline{\underline{10779}}$$

$$v) (2512)_8 = (\quad)_{10}$$

$$= ((2 \cdot 8 + 5) \cdot 8 + 1) \cdot 8 + 2 = (21 \cdot 8 + 1) \cdot 8 + 2 =$$

$$= 169 \cdot 8 + 2 = \underline{\underline{1354}}$$

2. A) $(3129)_{10} \rightarrow (6071)_8$

$$\begin{array}{r} 3129 \\ \hline 1 \quad 7 \end{array} \quad \begin{array}{r} 391 \\ \hline 0 \end{array} \quad \begin{array}{r} 48 \\ \hline 6 \end{array} \quad \begin{array}{r} 0 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 3129 : 8 = 391 : 8 = 48 \\ \hline 24 \\ 72 \\ \hline 72 \\ 72 \\ \hline 0 \\ 8 \\ \hline 1 \end{array} \quad \begin{array}{r} 391 : 8 = 48 \\ \hline 32 \\ 71 \\ \hline 71 \\ 64 \\ \hline 7 \\ 4 \end{array}$$

b) $(3129)_{10} \rightarrow (\quad)_2$

$$\begin{array}{r} 3129 \\ \hline 1 \quad 564 \quad 782 \quad 391 \quad 195 \quad 97 \quad 48 \quad 24 \quad 12 \quad 6 \quad 3 \quad 1 \quad 0 \\ \hline 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1 \quad 1 \end{array}$$

$$= (110000111001)_2$$

$$3) \ (3129)_{10} \rightarrow (C39)_{16}$$

$$\begin{array}{r|rrr|r} 3129 & 195 & 12 & 0 \\ \hline 9 & 3 & 12 & \leftarrow \end{array}$$

$$\begin{array}{r} 3129 \cdot 16 = 195 : 16 = 12 \\ \frac{16}{152} \\ \frac{144}{8} \\ \frac{80}{9} \\ \leftarrow \end{array} \quad \begin{array}{r} 16 \\ \frac{16}{35} \\ 32 \\ \leftarrow \end{array} \quad \textcircled{3}$$

$$4) \ (842)_{10} \rightarrow (\underline{\underline{23A2}})_{16}$$

$$\begin{array}{r|rrr|r} 842 & 52 & 3 & 0 \\ \hline 10 & 4 & 3 & \leftarrow \\ & & & \\ & & & = (34A) \end{array}$$

$$\begin{array}{r} 842 : 16 = 52 : 16 = 3 \\ \frac{80}{42} \\ \frac{32}{10} \\ \leftarrow \end{array} \quad \textcircled{4}$$

$$5) \ (736)_{10} \rightarrow (3224)_6$$

$$\begin{array}{r|rrr|r} 736 & 122 & 20 & 3 & 0 \\ \hline 4 & 2 & 2 & 3 & \leftarrow \end{array}$$

$$\begin{array}{r} 736 : 6 = 122 : 6 = 20 \\ \frac{6}{13} \\ \frac{12}{1} \\ \frac{16}{12} \\ \frac{12}{0} \\ \leftarrow \end{array} \quad \textcircled{5}$$

$$6) \ (3620)_{10} \rightarrow (13361)_7$$

$$\begin{array}{r|rrr|r} 3620 & 517 & 73 & 10 & 1 \\ \hline 1 & 6 & 3 & 3 & 1 \leftarrow \end{array}$$

$$\begin{array}{r} 3620 : 7 = 517 : 7 = 73 \\ \frac{35}{12} \\ \frac{7}{0} \\ \frac{50}{49} \\ \frac{49}{0} \\ \leftarrow \end{array} \quad \textcircled{6} \quad \begin{array}{r} 517 : 7 = 73 \\ \frac{49}{24} \\ \frac{21}{0} \\ \leftarrow \end{array} \quad \textcircled{7}$$

$$e) (928)_{10} \rightarrow (3A0)_{16}$$

$$\begin{array}{r|rrr} 928 & 58 & 3 & 0 \\ \hline 6 & 10 & 3 & \\ \end{array} \quad \leftarrow$$

$$\begin{array}{r} 928 : 16 = 58 \\ 80 \\ \hline 128 \\ 128 \\ \hline 0 \end{array}$$

$$H) (534)_{10} \rightarrow (1026)_8$$

$$\begin{array}{r|rrr} 534 & 66 & 8 & 1 & 0 \\ \hline 6 & 2 & 0 & 1 & \\ \end{array} \quad \leftarrow$$

$$\begin{array}{r} 534 : 8 = 66 \\ 48 \\ \hline 54 \\ 48 \\ \hline 6 \end{array}$$

$$3) (753)_{10} \rightarrow (2124)_7$$

$$\begin{array}{r|rrr} 753 & 107 & 15 & 2 & 0 \\ \hline 4 & 2 & 1 & 2 & \\ \end{array} \quad \leftarrow$$

$$\begin{array}{r} 753 : 7 = 107 : 7 = 15 \\ 7 \\ \hline 15 \\ 14 \\ \hline 1 \\ 1 \\ \hline 0 \\ 53 \\ 49 \\ \hline 4 \end{array}$$

$$ii) (549)_{10} \rightarrow (1144)_5$$

$$\begin{array}{r|rrr} 549 & 109 & 21 & 4 & 0 \\ \hline 4 & 4 & 1 & 4 & \\ \end{array} \quad \leftarrow$$

$$549 : 5 = 109 : 5 = 21$$

$$j) (851)_{10} \rightarrow (1573)_8$$

$$\begin{array}{r|rrr} 851 & 111 & 13 & 1 & 0 \\ \hline 3 & 7 & 5 & 1 & \\ \end{array} \quad \leftarrow$$

$$\begin{array}{r} 851 : 8 = 111 : 8 = 13 \\ 8 \\ \hline 11 \\ 8 \\ \hline 3 \\ 3 \\ \hline 1 \\ 1 \\ \hline 0 \\ 24 \\ 24 \\ \hline 0 \end{array}$$

$$k) (938)_{10} \rightarrow (3AA)_{16}$$

$$\begin{array}{r} 938 \\ \hline 10 \end{array} \quad \begin{array}{r} 58 \\ 10 \\ \hline 3 \end{array} \quad 0$$

$$\begin{array}{r} 938 \\ 80 \\ \hline 138 \\ 128 \\ \hline 10 \end{array}$$

$$B) A) (0.5625)_{10} \rightarrow (0.1001)_2$$

$$\begin{array}{r} 0.5625 \\ \hline 0.125 & 0.25 & 0.5 & 0 \\ \hline 0. & 1 & 0 & 0 & 1 \\ \hline \end{array} \quad \begin{array}{r} 0.5625 \\ 1.1250 \\ 125 \\ \hline 250 \end{array}$$

$$5) (0.375)_{10} \rightarrow (0.11)_4$$

$$\begin{array}{r} 0.375 \\ \hline 0.5 & 0 \\ \hline 0. & 1 & 2 \\ \hline \end{array} \quad \begin{array}{r} 0.375 \\ 0.500 \\ \hline \end{array}$$

$$B) (0.34)_{10} \rightarrow (0.13\bar{2})_5$$

$$\begin{array}{r} 0.34 \\ \hline 0.7 & 0.5 & 0.5 \\ \hline 0. & 1 & 3 & 2 \\ \hline \end{array} \quad \begin{array}{r} 0.345 \\ 1.70 \\ \hline 3.5 \\ 0.55 \\ \hline 2.5 \end{array}$$

$$C) (0.6875)_{10} \rightarrow (0.1011)_2$$

$$\begin{array}{r} 0.6875 \\ \hline 0.375 & 0.75 & 0.5 & 0 \\ \hline 0. & 1 & 0 & 1 & 1 \\ \hline \end{array}$$

$$\begin{array}{r} 0.6875 \\ 1.3750 \\ 0.375 \\ \hline 0.950 \end{array}$$

2) $(0.6875)_{10} \rightarrow (0.54)_8$

$$\begin{array}{r} 0.6875 \\ \times 0.5 \\ \hline 0.34375 \\ \xrightarrow{\quad\quad\quad} 0.54 \end{array}$$

$$\begin{array}{r} 0.6875 \\ \times 0.5 \\ \hline 0.34375 \\ \hline 0.54 \end{array}$$

$$\begin{array}{r} 0.6875 \\ \times 0.5 \\ \hline 0.34375 \\ \hline 0.54 \end{array}$$

4 A) $(107.675)_{10} = (?)_2$

$$\begin{array}{r} 107 | 53 | 26 | 13 | 6 | 3 | 1 | 0 \\ \downarrow \quad \downarrow \end{array}$$

$$\begin{array}{r} 0.675 | 0.35 | 0.7 | 0.4 | 0.8 | 0.6 | 0.3 | 0.4 | 0.8 \\ 0.1 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 0 \end{array}$$

$$= (1101011.1010110)_2$$

5

5 A) $(481)_9 \rightarrow (1105)_7$

$$= 4 \cdot 9^2 + 8 \cdot 9 + 1 = 324 + 72 + 1 = 397$$

$$\begin{array}{r} 397 | 56 | 8 | 1 | 0 \\ \hline 5 \quad 0 \quad 1 \quad 1 \end{array}$$

$$\begin{array}{r} 397 \div 7 = 56 \\ 35 \\ \hline 47 \\ 42 \\ \hline 5 \end{array}$$

$$5) (3012)_4 \rightarrow (160)_8$$

$$3 \cdot 4^3 + 4 + 2 = 192 + 6 = 198$$

$$\begin{array}{r} 198 \\ \hline 6 | 12 | 0 \\ \hline 12 | 0 \end{array}$$

$$198 : 16 = 12$$

$$\begin{array}{r} 16 \\ \hline 38 \\ -32 \\ \hline 6 \end{array}$$

$$3) (31230)_4 \rightarrow (11432)_5$$

$$3 \cdot 4^4 + 4^3 + 2 \cdot 4^2 + 3 = 768 + 64 + 32 + 3 = 867$$

$$\begin{array}{r} 867 | 173 | 34 | 6 | 1 | 0 \\ \hline 2 | 3 | 4 | 1 | 1 | \end{array}$$

$$867 : 5 = 173 : 5 = 34$$

$$\begin{array}{r} 5 \\ \hline 36 \\ -35 \\ \hline 1 \\ 15 \\ -15 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 173 \\ \hline 5 | 34 | 6 | 1 | 0 \\ \hline 15 | 23 | 2 | 1 | 0 \end{array}$$

$$r) (132.4)_5 \rightarrow (\quad)_4$$

$$5^2 + 3 \cdot 5 + 2 + 4 \cdot 5^{-1} = 25 + 15 + 2 + 0.8 = 42.8$$

$$\begin{array}{r} 42 | 10 | 2 | 0 \\ \hline 2 | 2 | 2 | \end{array}$$

$$\begin{array}{r} 0.8 | 0.2 | 0.8 | 0.2 \\ \hline 0. | 0.3 | 0 | 0.3 \end{array}$$

$$= (222.50)_4$$

$$\text{D) } (4021.23)_5 \rightarrow (\quad)_4$$

$$4 \cdot 5^3 + 2 \cdot 5 + 1 + 2 \cdot 5^{-1} + 3 \cdot 5^{-2} = 500 + 10 + 0.4 + 0.12 = \\ = 511.52$$

$$\begin{array}{r} 511 : 4 = 127 : 4 = 31 \\ \hline 511 | 127 | 31 | 7 | 1 | 0 \\ , 3 | 3 | 3 | 3 | 1 | \leftarrow \\ \hline 8 \\ 31 \\ 28 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 0.52 | 0.08 | 0.32 | 0.28 | 0.12 | 0.48 | 0.92 | 0.68 | 0.72 | 0.08 \\ \hline 0. | \boxed{2} | 0 | 1 | 1 | 0 | 1 | 3 | 2 | 2 \\ \hline 0.52 | \boxed{0.08} \\ \hline 3 | \boxed{2} \end{array}$$

$$= (13333, \overline{2011013223})_4$$

$$\text{E) A) } (AB6)_{16} \rightarrow (\quad)_8$$

$$(AB6)_{16} = (\underline{1010} \underline{1011} \underline{0110})_2 =$$

$$= (\underline{\underline{52}} \underline{\underline{66}})_8$$

$$\begin{array}{r} 8 | 4 | 2 | 1 \\ \hline 4 | 2 | 1 \end{array}$$

$$\text{b) } (0.AB6)_{16} \rightarrow (\quad)_8$$

$$(0.AB6)_{16} = (0, \underline{1010} \underline{1011} \underline{0110})_2 =$$

$$= (0, \underline{\underline{52}} \underline{\underline{66}})_8$$

$$3) (32)_4 \rightarrow (\quad)_5$$

$$(32)_4 = (\underline{11} \underline{10})_2 = (\underline{\underline{10}})_8$$

$$\begin{array}{r} & 2 \\ & 1 \\ \hline 4 & 2 & 1 \end{array}$$

$$4) (0.32)_4 \rightarrow (\quad)_8$$

$$(0.32)_4 = (0.\underline{11} \underline{10})_4 = (0.\underline{\underline{10}})_8$$

$$5) (\underline{3} \underline{2} \underline{2} \underline{3} \underline{2})_4 \rightarrow (\underline{3} \underline{A} \underline{E})_{16}$$

$$6) (\underline{0} \underline{3} \underline{2} \underline{2} \underline{3} \underline{2})_4 \rightarrow (0.\underline{EB8})_{16}$$

$$e) (37.56)_8 \rightarrow (\quad)_4$$

$$(37.56)_8 = (\underline{0} \underline{1} \underline{1} \underline{1} \underline{1}, \underline{1} \underline{0} \underline{1} \underline{1} \underline{0})_2 = (\underline{\underline{1} \underline{3} \underline{3}} \cdot \underline{2} \underline{3} \underline{2})_4$$

$$III) (D2.EA5)_{16} = (\quad)_2$$

$$= (\underline{\underline{1} \underline{1} \underline{0} \underline{1} \quad 0} \underline{0} \underline{1} \underline{0} \cdot \underline{\underline{1} \underline{1} \underline{1} \underline{0} \quad 1} \underline{0} \underline{1} \underline{0} \quad 0} \underline{1} \underline{0} \underline{1})_2$$

$$3) (C1.F1F92)_{16} = (\quad)_4$$

$$= (\underline{\underline{3} \underline{0} \quad 0} \underline{1}, \underline{3} \underline{3} \quad 0 \underline{1} \quad 3 \underline{3} \quad 2 \underline{1} \quad 0 \underline{2})_4$$

$$\begin{array}{r} & 4 \\ & 1 \\ \hline \end{array}$$

$$4) (275 \cdot 364)_8 = (\quad)_2$$

$$= (\underline{\underline{0} \underline{1} \underline{0} \quad 1} \underline{1} \underline{1} \quad 1 \underline{0} \underline{1} \cdot \underline{\underline{0} \underline{1} \underline{1} \quad 1} \underline{1} \underline{0} \quad 1 \underline{0} \underline{0})_2$$

- j) $(\underline{101} \underline{10001}, \underline{0101101})_2 = (\underline{261.26})_8$
- k) $(\underline{101101}, \underline{01})_2 = (\underline{2D.4})_{16}$
- l) $(D4C9.A2)_{16} = (\quad)_8$
- $= (\underline{101}, \underline{0100} \underline{1100} \underline{1001}, \underline{1010} \underline{0010})_2$
- $= (\underline{152311.504})_8$
- m) $(3220)_4 \rightarrow (\quad)_8$
- $= (\underline{11}, \underline{10} \underline{10} \underline{00})_2 = (\underline{350})_8$
- n) $(AB7F)_{16} = (\quad)_4$
- $= (\underline{22} \underline{23} \underline{13} \underline{33})_4$
- p) $(832.41F01)_8 = (\quad)_3$
- $= (\underline{22} \underline{10} \underline{02}, \underline{11} \underline{01} \underline{21} \underline{00} \underline{01})_3$
- q) $(7A34)8 = (\quad)_{16}$
- $= (\underline{111} \underline{001} \underline{011} \underline{100})_2 = (\underline{E5C})_{16}$
- r) $(2A47)_8 = (\quad)_{16}$
- $= (\underline{010} \underline{001} \underline{100} \underline{111})_2 = (\underline{467})_{16}$

$$\text{u) } (\text{CASE})_{16} = (\quad)_8$$

$$= (\underline{\underline{1100}} \underline{\underline{1010}} \underline{\underline{1001}} \underline{\underline{1110}})_2 = (\underline{\underline{145236}})_8$$

$$\text{p) } (65743)_{18} = (\quad)_{16}$$

$$= (\underline{\underline{110}} \underline{\underline{101}} \underline{\underline{101}} \underline{\underline{100}} \underline{\underline{011}})_2 = (\underline{\underline{6BE3}})_{16}$$

$$\text{c) } (\text{CGF})_{16} = (\quad)_8$$

$$= (\underline{\underline{1100}} \underline{\underline{1001}} \underline{\underline{111}})_2 = (\underline{\underline{6237}})_8$$

$$\text{u) } (7436)_8 = (\quad)_{16}$$

$$= (\underline{\underline{111}} \underline{\underline{100}} \underline{\underline{011}} \underline{\underline{110}})_2 = (\underline{\underline{FAE}})_{16}$$

$$\boxed{8} \text{ A) } (101011.011)_8 = (\quad)_{10}$$

$$= (-2)^6 + (-2)^4 + (-2)^5 + (-2)^3 + 1 + (-2)^{-2} + (-2)^{-3} :$$

$$= 64 + 16 - 8 - 1 + 0.25 - 0.125 = \underline{\underline{71.125}}$$

$$5) (938)_{10} = (\underline{\underline{5AA}})_{16}$$

$$\begin{array}{r} 938 \\ \hline 10 \end{array} \quad \begin{array}{r} 58 \\ \hline 10 \end{array} \quad \begin{array}{r} 3 \\ \hline 3 \end{array} \quad \begin{array}{l} 0 \\ \leftarrow \end{array}$$

$$\begin{array}{r} 938; 16 = 58 \\ \hline 80 \\ 138 \\ 128 \\ \hline 10 \end{array}$$

$$B) (C\Gamma)_8 = ()_8$$

$$\therefore (1100 \ 1001 \ 111)_2 = (6237)_8$$

$$r) (123303.102)_4 = ()_{10}$$

$$= 4^5 + 2 \cdot 4^4 + 3 \cdot 4^3 + 3 \cdot 4^2 + 3 + 4^1 + 0 \cdot 4^{-3}$$

$$= 1024 + 512 + 192 + 48 + 3 + 0.25 + 0.03125 =$$

$$= 1779.28125$$

$$II) (146.625)_{10} = ()_2$$

$$\begin{array}{r} 146 \ 73 \ 36 \ 18 \ 9 \ 4 \ 2 \ 1 \ 0 \\ \hline 0 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0 \ 1 \ 0 \end{array}$$

$$\begin{array}{r} 0.625 \ 0.25 \ 0.08 \ 0 \\ \hline 0. \ 1 \ 0 \ 1 \end{array} \quad \begin{array}{r} 0.625 \cdot 2 \\ \hline 1.250 \end{array}$$

$$= (10010010.101)_2$$

$$f) (A174)_{27} = ()_9$$

$$= (101 \ 001 \ 021 \ 011)_3 =$$

$$= (331234)_9$$

$$e) (536)_7 = (1132)_6$$

$$= 5 \cdot 7^2 + 3 \cdot 7 + 6 = 245 + 21 + 6 = 272$$

$$\begin{array}{r} 272 \\ 2 \end{array} \begin{array}{r} 45 \\ 3 \end{array} \begin{array}{r} 7 \\ 1 \end{array} \begin{array}{r} 1 \\ 1 \end{array} \begin{array}{r} 0 \\ \leftarrow \end{array}$$

$$\begin{array}{r} 272 : 6 = 45 \\ \underline{24} \\ 32 \\ 30 \\ \underline{2} \end{array}$$

$$u) (100001,001)_2 = (\quad)_{10}$$

$$= 2^6 + 2^5 + 1 + 2^{-3} = 64 + 32 + 1 + 0.125 = \underline{\underline{97.125}}$$

$$j) (2145)_{10} = (\underline{\underline{4141}})_8$$

$$\begin{array}{r} 2145 \\ 1 \end{array} \begin{array}{r} 268 \\ 4 \end{array} \begin{array}{r} 33 \\ 1 \end{array} \begin{array}{r} 4 \\ 4 \end{array} \begin{array}{r} 0 \\ \leftarrow \end{array}$$

$$\begin{array}{r} 2145 : 8 = 268 : 8 = 33 \\ \underline{16} \\ 54 \\ 48 \\ \underline{24} \\ 24 \\ 24 \\ \underline{0} \end{array}$$

$$n) (8AF.4D)_{16} = (\quad)_8$$

$$\begin{aligned} &= (\underline{\underline{1000}} \underline{\underline{1010}} \underline{\underline{1111}} \underline{\underline{.0110}} \underline{\underline{1101}})_2 \\ &= (\underline{\underline{4257}} \underline{\underline{232}})_8 \end{aligned}$$

$$w) (221_3)_4 = (\quad)_{10} = (\quad)_3$$

$$= 2 \cdot 4^2 + 2 \cdot 4^1 + 1 \cdot 4^0 = 32 + 8 + 0 \cdot 1 = 41.75 = \underline{\underline{41.75}}$$

$$\begin{array}{r} 4 \\ 14 \\ \hline 2 \end{array} \left| \begin{array}{cccc} 1 & 3 & 4 & 1 \end{array} \right. \begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \end{array}$$

$$\begin{array}{r} 0.75 \\ 0.25 \\ \hline 0. \end{array} \left| \begin{array}{cc} 0.75 & 0.75 \\ 2 & 0 \end{array} \right.$$

$$\begin{array}{r} 0.75 \cdot 3 \\ \hline 2.25 \end{array}$$

$$= (\underline{\underline{1112.20}})_3$$

$$6) A) (3220)_6 = (\quad)_3$$

$$\begin{array}{r} 3220 \\ \hline 1 \end{array} \left| \begin{array}{cccc} 1 & 0 & 3 & 1 \end{array} \right. \begin{array}{c} 12 \\ 1 \\ 2 \\ 0 \end{array}$$

1	11	12
2	12	22
3	13	23
10	20	30

$$3220 : 3 = 1031 : 3 = 121 : 3 = 20 : 3 = 2$$

$$\begin{array}{r} 10 \\ 13 \\ \hline 1 \end{array} \left(\begin{array}{c} 1 \\ 1 \\ 1 \end{array} \right) \quad \begin{array}{r} 1 \\ 2 \\ \hline 1 \end{array} \left(\begin{array}{c} 1 \\ 2 \\ 1 \end{array} \right)$$

$$= (\underline{\underline{22121}})_3$$

$$5) (3042)_5 = (\quad)_7 \quad (7)_{10} = (12)_5$$

$$\begin{array}{r} 3042 \\ \hline 5 \end{array} \left| \begin{array}{cccc} 2 & 1 & 1 & 1 \end{array} \right. \begin{array}{c} 0 \\ 1 \\ 1 \end{array}$$

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
10	20	30	40	100

$$3042 : 12 = 211 : 12 = 13 : 12 = 1$$

$$\begin{array}{r} 14 \\ 22 \\ \hline 5 \end{array} \left(\begin{array}{c} 1 \\ 1 \\ 1 \end{array} \right) \quad \begin{array}{r} 1 \\ 2 \\ \hline 1 \end{array} \left(\begin{array}{c} 1 \\ 2 \\ 1 \end{array} \right)$$

$$= (\underline{\underline{1105}})_7$$

$$3) (234)_5 = (\quad)_8$$

$$\begin{array}{r} 234 \\ \hline 10 | 0 | 1 | 0 \\ \hline \end{array}$$

$$234 : 13 = 13 ; 13 : 13 = 1$$

(1)

$$= (\underline{\underline{105}})_8$$

$$(8)_{10} = (10)_5$$

1	11	21	31	41	101
2	12	22	32	42	102
3	13	23	33	43	103
4	14	24	34	44	104
10	20	30	40	100	110

$$7) (2301.32)_4 = (\quad)_6$$

$$\begin{array}{r} 2301 | 131 | 10 | 0 \\ \hline 3 | 5 | 4 | \underline{\underline{0}} \end{array}$$

$$2301 : 12 = 131 ; 12 : 10 : 10 : 10 = 0$$

$$\begin{array}{r} 110 \\ 21 \\ \hline 5 \end{array}$$

(3)

$$(6)_{10} = (\underline{\underline{12}})_4$$

1	11	21	31	101
2	12	22	32	102
3	13	23	33	103
10	20	30	100	110

$$\begin{array}{r} 0.32 | 0.1 | 0.2 | 0 \\ \hline 0. | 11 | 1 | 3 \\ \hline \end{array}$$

$$\begin{array}{r} 0.32 \cdot 12 \\ \hline 130 \\ 032 \\ \hline 1110 \end{array}$$

$$\begin{array}{r} 22 = 4 : 10 \\ 2 \cdot 3 + 1 = 7 = 13 \end{array}$$

$$\begin{array}{r} 312 = 5 : 11 \\ 1 + 3 + 1 = 5 = 11 \end{array}$$

$$= (\underline{\underline{450}}, \underline{\underline{513}})$$

$$\begin{array}{r} 0.1 \cdot 12 \\ \hline 1.2 \\ 0.2 \cdot 12 \\ \hline 1.0 \\ 0.2 \\ \hline 0.3.0 \end{array}$$

$$\text{d)} (2212)_3 = (\quad)_2$$

2	2	1	2	1	0	2	0	1	0
1	0	1	1	0	1	0	1	0	1

1	11	21	131
2	12	22	132
3	20	100	110
11	110	111	111

$$2212 : 2 = 1102 : 2 = 201 : 2 = 100 : 2 = \underline{\underline{4}} \quad 11 : 2 = 2 : 2 = 1$$

(1) (1)

$$= (1001101)_2$$

$$\text{f)} (13032)_4 = (\quad)_9 \quad (9)_{10} = (\underline{\underline{21}})_4$$

1	3	0	3	2	3	0	3	1	0
3	1	6	5	—					

$$13032 : 21 = 303$$

132

(3)

1	11	21	31	101	111	121	131
2	12	22	32	102	112	122	132
3	13	23	(33)	103	113	123	133
10	20	(30)	100	110	120	130	200

$$303 : 21 = 11 : 21 = 0$$

(3)

$$\text{e)} (1741C)_{10} = (\quad)_8 \quad = (563)_9$$

$$= (\underline{\underline{1010}}, \underline{\underline{0111}}, \underline{\underline{0100}}, \underline{\underline{1100}})_2 =$$

$$= (\underline{\underline{123514}})_8$$

$$H) (3213)_4 = ()_5$$

$$\begin{array}{r} 3213 \\ \hline 1 \quad 1 \quad 4 \quad 1 \end{array} \quad \begin{array}{|c|c|c|c|c|} \hline 2 & 3 & 2 & 1 & 1 & 0 \\ \hline \end{array}$$

$$(5)_{10} = (11)_4$$

$$\begin{array}{ccccccccc} 1 & 1 & 2 & 3 & 1 & 1 & 0 \\ 2 & 1 & 2 & 3 & 2 & 1 & 0 \\ 3 & 1 & 3 & 2 & 3 & 3 & 0 \\ 10 & 20 & 30 & 100 & 100 & 100 & 0 \\ \hline 110 & & & & & & \end{array}$$

$$3213 : 11 = 232 : 11 = 21 : 11 = 1$$

$$\begin{array}{r} 23 \\ 1 \\ \hline 1 \end{array}$$

$$3) (2102 \cdot 2)_3 = ()_4$$

$$\begin{array}{r} 2102 \\ \hline 1 \quad 0 \end{array} \quad \begin{array}{|c|c|c|c|c|} \hline 1 & 2 & 1 & 1 & 0 \\ \hline \end{array}$$

$$= \underline{(1111)}$$

$$(4)_{10} = (11)_3$$

$$\begin{array}{ccccccccc} 1 & 1 & 2 & 1 & 1 & 0 \\ 2 & 1 & 2 & 2 & 1 & 0 \\ 10 & 20 & 100 & 100 & 100 & 0 \\ \hline 110 & & & & & & \end{array}$$

$$2102 : 11 = 121 : 11 = 11 : 11 = 1$$

$$\begin{array}{r} 12 \\ 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 0.2 \\ 0.2 \\ \hline 0.2 \end{array}$$

$$\begin{array}{r} 0.2 \cdot 11 \\ 0.2 \\ \hline 0.2 \\ 2.2 \\ \hline 0.2 \cdot 11 = 2.2 \end{array}$$

$$\rightarrow = \underline{(1001 \cdot 2)_4}$$

$$4) (5243)_6 = (\quad)_4$$

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

1	11	21	31
2	12	22	32
3	13	23	33
4	14	24	34
5	15	25	35
10	20	30	40

$$5243 : 4 = 1210 : 4 = 201 : 4 = 30 \quad \textcircled{1}$$

$$12 \quad \textcircled{2} \quad 10 \quad \textcircled{3}$$

$$30 : 4 = 4 \quad \textcircled{2} \quad = (102123)_4$$

$$[9] A) (21012)_3 = (\quad)_{16}$$

$$(1G)_{10} = (\underline{121})_3$$

2	1	0	1	2	1	0
2	1	2	1	0	1	0

$$21012 : 121 = 110$$

121

\textcircled{2}

1	11	21	121	111	121	201
2	12	22	102	112	122	202
10	20	100	(110)	120	200	(210)

$$110 : 121 = 0$$

$$= (C2)_{16}$$

$$5) (201)_3 = (\quad)_2$$

2	0	1	0	0	1	0	0	1	0	0	0	0
1	1	0	0	0	1	0	0	1	0	0	0	0

1	11	21
2	12	22
10	20	100

$$201 : 2 = 100 : 2 = 4 \quad 11 : 2 = 2$$

\textcircled{1}

\textcircled{1}

$$= (\underline{10011})_2$$

$$3) (634)_7 = (\underline{12A})_{10}$$

$$\begin{array}{r} 634 \\ \hline 101210 \end{array}$$

$$(1G)_{10} = (R2)_7$$

$$634 : 22 = 24 : 22 = 1$$

$$134$$

(1)

(1)

1	11	21	31	41	51	G1	101	111	M1	131
2	12	22	32	42	52	G2	102	112	M2	132
3	13	23	33	43	53	G3	103	113	M3	133
4	14	24	34	44	54	G4	104	114	M4	134
5	15	25	35	45	55	G5	105	115	M5	135
6	16	26	36	46	56	G6	106	116	M6	136
7	20	30	40	50	60	G7	100	110	M7	140

② Задача означена відповідь

11. A) $(-4375)_8$, 6 знаків, $k=27$

ЗАВ: 404375

$$(27)_{10} = (33)_8$$

Н.К: 773402

П.К: 773403

Бинар: 773436

б) $(100100.101)_2$, $k=27$ $(27)_{10} = (11011)_2$

ЗАВ: 0100100.101 = Н.К = 110

+ 11011

Бинар: 0111111.101

в) $(-6A.1)_{16}$, 5 знаків, $k=27$ $(27)_{10} = (1B)_{16}$

ЗАВ: F0GA.1

н.к: FF95.F

Н.К: FF95.E

+ 1B

+ 1

Бинар: FFBO.F

г) $(-9B00)_{16}$, $k=19$ $(19)_{10} = (13)_{16}$

ЗАВ: F9B00

н.к: F6500

Н.К: F64FF

+ 1B

+ 1

Бинар: F6513

д) $(304.12)_5$, $k=19$

$$(19)_{10} = (34)_5$$

ЗАВ: 0304 12 = Н.К = 19
+ 34

Бинар: 0343.12

$$f) (-462)_8, 5 \text{ yndapra}, k=19 \quad (AB)_9 = (23)_8$$

$$\begin{array}{r} \text{3AB: } 70462 \\ \text{HK: } 7731.5 \\ + 1 \\ \hline \text{Gunaik: } 77546 \end{array}$$

$$e) (-2031)_4, 6 \text{ yndapra}, k=17 \quad (17)_{10} = (101)_4$$

$$\begin{array}{r} \text{3AB: } 302031 \\ \text{HK: } 331302 \\ + 1 \\ \hline \text{Gunaik: } 332313 \end{array}$$

$$d) (-6410)_{16}, k=17 \quad (17)_{10} = (11)_{16}$$

$$\begin{array}{r} \text{3AB: } FC410 \\ \text{HK: } F3BF0 \\ + 1 \\ \hline \text{Gunaik: } F3C01 \end{array}$$

$$3) (156.3)_7, k=17 \quad (17)_{10} = (23)_7$$

$$\begin{array}{r} \text{3AB: } 0156.3 \\ + 23 \\ \hline \text{Gunaik: } 0212.3 \end{array}$$

$$4) (8396)_{10} = (20CC)_{16}, 5 \text{ yndapra}$$

$$\begin{array}{r} 8396 \\ \hline 12 | 12 | 0 | 2 \\ \hline \end{array} \quad \begin{array}{r} 8396:16 = 524:16 = 32 \\ \hline 80 \\ \hline 32 \\ \hline \end{array}$$

$3AB = HK = NK: 020CC$

96
64 (12)
13

j) $(-7414)_{10} = (\quad)_{16}$, сумдара

$$\begin{array}{r|rrrr|rr}
7 & 4 & 1 & 4 & 4 & 6 & 3 \\
\hline
6 & 1 & 5 & 1 & 2 & 1 & 0
\end{array} \quad \leftarrow$$

$$= -(ACFG)_{16}$$

ЗАВ: F1GF6

НК: FE309
+1

НК: FE30A

$$7414 : 16 = 463 : 16 = 28$$

$$\begin{array}{r}
64 \\
108 \\
\hline
96 \\
54 \\
48 \\
\hline
15
\end{array}$$

(6)

k) $(983)_{10} = (\quad)_8$, сумдара

$$\begin{array}{r|rrrr|rr}
9 & 8 & 3 & 1 & 2 & 2 & 1 & 5 & 1 & 0 \\
\hline
8 & 2 & 7 & 1 & 1 & 1 & 1 & 1 & 1 & 0
\end{array} \quad \leftarrow$$

$$= (1727)_8$$

ЗАВ: 014 = НК = 01727

$$983 : 8 = 122 : 8 = 15$$

$$\begin{array}{r}
8 \\
12 \\
\hline
4 \\
16 \\
40 \\
\hline
23 \\
16 \\
\hline
7
\end{array}$$

(2)

l) $(-2798)_{10} = (\quad)_8$, сумдара

$$\begin{array}{r|rrrr|rr}
2 & 7 & 9 & 8 & 3 & 4 & 9 & 4 & 3 & 5 & 0 \\
\hline
6 & 5 & 3 & 5 & 5 & 3 & 5 & 3 & 5 & 5 & 0
\end{array} \quad \leftarrow$$

$$= -(5356)_8$$

ЗАВ: 75356

НК: 72429

НК: 72422

$$2798 : 8 = 349 : 8 = 43$$

$$\begin{array}{r}
24 \\
32 \\
\hline
39 \\
32 \\
78 \\
72 \\
\hline
6
\end{array}$$

(5)

$$\text{I)} \quad (732)_{10} = (?)_7, \quad k=31 \quad (31)_{10} = (43)_7$$

$$\begin{array}{r} 732 \\ \hline 4 | 104 | 14 | 2 | 0 \\ \hline 6 | 0 | 2 | \end{array} \quad \leftarrow$$

$$732 : 7 = 104 : 7 = 14$$

$$\begin{array}{r} 7 \\ \hline 102 \\ - 7 \\ \hline 34 \\ - 28 \\ \hline 6 \end{array}$$

$$(2064)_2$$

$$3AB = HK = NK = \begin{array}{r} 11 \\ 02064 \\ + 43 \\ \hline \end{array}$$

Guruwar: 02140

$$\text{II)} \quad (-1045)_{10} = (?)_{16}, \quad k=31$$

$$\begin{array}{r} 1045 \\ \hline 5 | 65 | 4 | 0 \\ \hline 1 | 4 | \end{array} \quad \leftarrow$$

$$1045 : 16 = 65 : 16 = 4$$

$$\begin{array}{r} 96 \\ \hline 64 \\ - 85 \\ \hline 80 \\ - 80 \\ \hline 0 \end{array}$$

$$= -(415)_{16}$$

$$3AB: F415$$

$$HK: FB\overset{1}{B}EA$$

$$NK: FB\overset{1}{B}EB$$

$$+ MF$$

$$\text{Guruwar: } FCOA$$

$$(31)_{10} = (1F)_{16}$$

ii) $(197)_{10} = (\quad)_2^{10}$, $k=12$ $(12)_{10} = (1100)_2$

197	98	49	24	12	6	3	1	0
1	0	1	0	0	0	1	1	0

$197 : 2 = 98 : 2 = 49, 0 : 2 = 24$

$$\begin{array}{r} 18 \\ 17 \\ 16 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ 18 \\ 16 \\ \hline 8 \end{array}$$

$$= (1100\ 0101)_2$$

3AB: 0011000101 = HK = NK
 $+ 1100$
 \hline
 00111010001

b) $(-125)_{10} = (\quad)_6^5$, $k=12$ $(12)_{10} = (20)_6$

125	20	3	0
5	2	3	

$125 : 6 = 20 : 6 = 3$

$$\begin{array}{r} 12 \\ 15 \\ \hline 15 \end{array} \quad \begin{array}{r} 18 \\ 18 \\ \hline 0 \end{array}$$

$$= -(325)_6^3$$

3AB: 50325

HK: 55230

NK: 55231
 $+ 20$
 \hline
 Quot: 55231

$$o) (5211)_{10} = (\quad)_4^8, k=13 \quad (13)_{10} = (31)_4$$

$$\begin{array}{r} 5211 \\ - 3211 \\ \hline 1302 \end{array}$$

$$= (1101123)_4^7$$

$$3AB: 001101123 = HK = HK \\ + 31$$

Gesuch: 001101220

$$\begin{array}{r} 5211 : 4 = 1302 : 4 = 325 \\ - 12 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 12 \\ - 12 \\ \hline 0 \end{array}$$

$$325 : 4 = 81$$

$$\begin{array}{r} 32 \\ - 15 \\ \hline 17 \\ - 15 \\ \hline 2 \end{array}$$

(1)

$$k=13$$

$$(13)_{10} = (15)_8$$

$$\bar{o}) (-84.6875)_{10} = (\quad)_8^8, k=13$$

$$\begin{array}{r} 84 \\ - 4 \\ \hline 10 \\ - 2 \\ \hline 11 \\ \leftarrow \end{array} \quad \begin{array}{r} 0.6875 \\ - 0. \\ \hline 0.5 \\ - 0. \\ \hline 4 \end{array}$$

$$\begin{array}{r} 0.6875 \\ - 0.5 \\ \hline 0.1875 \\ - 0.15 \\ \hline 0.0375 \\ - 0.03 \\ \hline 0.0075 \\ - 0.005 \\ \hline 0.0025 \\ - 0.002 \\ \hline 0.0005 \\ - 0.0005 \\ \hline 0 \end{array} = -(124.54)_8^5$$

$$3AB: 100124.54$$

$$HK: 777653.23$$

$$+ 1$$

$$HK: 777653.24 \\ + 15$$

Gesuch: 777670.24

$$p) (546)_{10} = (\quad)_4, b=14 \quad (111)_{10} = (32)_4$$

$$\begin{array}{r} 546 \\ - 2 \end{array} \left| \begin{array}{ccccc} 1 & 3 & 6 & 3 & 4 \\ 0 & 2 & 0 & 2 & 0 \end{array} \right.$$

$$546 \div 4 = 136 : 4 = 34$$

$$\begin{array}{r} 4 \\ 14 \\ - 12 \\ \hline 2 \\ 24 \\ - 24 \\ \hline 0 \end{array}$$

$$= (20202)_4$$

$$3AB: \begin{array}{r} 020202 \\ + 32 \\ \hline \end{array} \cdot nk = 4k$$

$$\text{Gauß: } 020300$$

$$c) (-642.64)_{10} = (\quad)_5, b=14 \quad (111)_{10} = (24)_5$$

$$\begin{array}{r} 642 \\ - 2 \end{array} \left| \begin{array}{ccccc} 1 & 2 & 8 & 2 & 5 \\ 3 & 0 & 0 & 0 & 1 \end{array} \right.$$

$$\begin{array}{r} 642 \cdot 5 : 128 : 5 : 25 \\ - 5 \\ \hline 14 \\ - 10 \\ \hline 42 \\ - 42 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 0.64 \\ - 0.64 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 0.64 \cdot 5 \\ - 3.20 \\ \hline \end{array} = -(10032.31)_5$$

$$3AB: 410032.31$$

$$nk: 434412.13$$

$$+ 1$$

$$nk: \begin{array}{r} 434412.14 \\ + 24 \\ \hline \end{array}$$

$$\text{Gauß: } \begin{array}{r} 434411.14 \\ + 1 \\ \hline \end{array}$$

$$7) (-8234 \cdot 875)_{10} = (\quad)_4, k=52 \quad (52)_{10} = (310)_4$$

$$\begin{array}{r}
 8234 \mid 2058 \mid 514 \mid 128 \mid 32 \mid 8 \mid 2 \mid 0 \\
 \hline
 2 \mid 2 \mid 2 \mid 0 \mid 0 \mid 0 \mid 1 \mid 2 \mid 8 \\
 \hline
 0.875 \mid 0.5 \mid 0 \\
 \hline
 0. \overbrace{5}^{3} \mid 0.2 \\
 \hline
 0.875 \cdot 4 = (-2000222,32)_4 \\
 3.500
 \end{array}$$

$$3AB: 32000222,32$$

$$AC: 31333111.01$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$NC: 31333111.02$$

$$+ 310$$

$$\text{Gesamt: } 32000021,02$$

$$h) (-B7)_{16} = (\quad)_3, k=52 \quad (52)_{10} = (1221)_3$$

$$-(B7)_{16} = -(11 \cdot 16 + 7) = -(183)_{10}$$

$$\begin{array}{r}
 183 \mid 61 \mid 20 \mid 6 \mid 2 \mid 0 \\
 \hline
 0 \mid 1 \mid 2 \mid 0 \mid 2 \mid 18
 \end{array}$$

$$= (-20210)_3$$

$$3AB: 220210$$

$$AC: 202012$$

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$NC: 202020$$

$$+ 1221$$

$$\text{Gesamt: } 211011$$

$$y) (-1375)_{10} = (\quad)_5, k=14 \quad (14)_10 = (24)_5$$

$$\begin{array}{r|ccccc|c} 1375 & 2 & 5 & 5 & 1 & 1 & 2 & 0 \\ \hline & 0 & 0 & 1 & 2 & & & \\ \end{array}$$

$$= (121000)_5$$

$$1375 : 5 = 275 : 5 = 55$$

$$\begin{array}{r} 10 \\ \hline 35 \\ 35 \\ \hline 25 \end{array}$$

$$3AB: 421000$$

$$4K: 423444$$

+ 1

$$nK: 424000$$

+ 24

$$\text{Gesamtk}: 424024$$

$$q) (6633 \cdot 375)_{10} = (\quad)_8, k=14 \quad (14)_10 = (16)_8$$

$$\begin{array}{r|ccccc|c} 6633 & 7 & 5 & 4 & 9 & 4 & 1 & 1 & 2 \\ \hline & 1 & 2 & 6 & 3 & 1 & & & \\ \end{array}$$

$$6633 : 8 = 754 : 8 = 94 : 8 = 11$$

$$\begin{array}{r} 56 \\ \hline 43 \\ 40 \\ \hline 34 \\ 32 \\ \hline 2 \end{array}$$

$$\begin{array}{r|c} 0.375 & 0 \\ \hline 0 & 3 \\ \hline 0.4 \\ \hline \end{array}$$

$$\begin{array}{r} 0.3758 \\ \hline 3.000 \end{array} = (13621.3)$$

$$\begin{array}{r} 33 \\ \hline 32 \\ \hline 1 \end{array}$$

$$3AB: 013621.3 = 4K = nK$$

+ 16

$$\text{Gesamtk}: 013637.3$$

3) Складывание и вычитание

A) $(43102)_5 + (00134)_5 =$

Знак: 4
A-B: 3102

$$\begin{array}{r} -0134 \\ \hline 2413 \end{array}$$

$$= (42413)_5$$

Неверно округлено!

б) $(100101)_2 + (1010011)_2 =$

Знак: 1

A-B: 001101
- 010011

$$\begin{array}{r} \\ \hline 100000 \end{array}$$

$$= (110000)_2$$

Неверно округл!

в) $(03023)_4 + (00231)_4 =$

Знак: 1

AB: 3023

$$+ 0231$$

$$\begin{array}{r} \\ \hline 3320 \end{array}$$

$$= (03320)_4^5$$

Неверно округл!

г) $(730521)_8 + (045277)_8 =$

Знак: 0

AB: 45277

$$\begin{array}{r} -30521 \\ \hline 14556 \end{array}$$

$$= (014556)_8^6$$

Неверно округл!

$$2) (0A37C)_{16}^5 - (0421B)_{16}^5 =$$

$$= (0A37C)_{16}^5 + (F421B)_{16}^5$$

Знак: 0

$$\begin{array}{r} AB: \\ A37C \\ - 421B \\ \hline 6161 \end{array}$$

$$= (06161)_{16}^5$$

Неверно!

$$f) (01836)_{10}^5 - (93527)_{10}^5 = (01836)_{10}^5 + (03527)_{10}^5$$

Знак: 0

$$\begin{array}{r} AB: \\ 1836 \\ + 3527 \\ \hline 5363 \end{array}$$

$$= (05363)_{10}^5$$

Неверно!

$$e) (03521)_{10}^5 + (04130)_{10}^5$$

Знак: 0,

$$\begin{array}{r} AB: \\ 3521 \\ + 4130 \\ \hline 12051 \end{array}$$

$$= (012051)_{10}^5 \quad \text{Преобразование!}$$

$$4) (220211)_3^6 - (010111)_3^6 = (220211)_3^6 + (210111)_3^6$$

Знак: 2

$$\begin{array}{r} AB: \\ 20211 \\ + 10111 \\ \hline 101022 \end{array}$$

$$= (2101022)_3^6 \quad \text{Преобразование!}$$

4) 2) а) $(32102)_4^5 + (02201)_4^5 =$

$$\begin{array}{r} 32102 \\ + 02201 \\ \hline 100303 \end{array}$$

$$= (00310)_4 \text{ Несо} \overset{\wedge}{\text{прекорачене!}}$$

б) $(00412)_5^5 + (01302)_5^5 =$

$$\begin{array}{r} 00412 \\ - 01302 \\ \hline 02214 \end{array}$$

$$= (02214)_5 \text{ Несо} \overset{\wedge}{\text{прекорачене!}}$$

в) $(520311)_6^6 - (501012)_6^6 =$

$$= (520311)_6^6 + (054543)_6^6$$

$$\begin{array}{r} 520311 \\ + 054543 \\ \hline 1015254 \end{array}$$

$$= (015255)_6^6$$

г) $(11001101)_2^8 - (01101010)_2^8 =$

$$= (11001101)_2^8 + (10010101)_2^8$$

$$\begin{array}{r} 11001101 \\ + 10010101 \\ \hline 101100010 \end{array}$$

Прекорачене! Довело към грешка

$$2) (FC20A)_16^5 + (F3F4A)_16^5 =$$

$$\begin{array}{r} FC20A \\ + F3F4A \\ \hline \overline{F0A4B} \end{array}$$

$$= (F0A4C)_16^5 \quad \text{Нечётное}$$

$$5) (0302A)_4^5 + (01102)_4^5 =$$

$$\begin{array}{r} 0302A \\ + 01102 \\ \hline \overline{10123} \end{array}$$

Прекрасно! Давай же это
решение вывести

$$e) (0535)_7^4 - (0446)_7^4 = (0535)_7^4 + (6220)_7^4$$

$$\begin{array}{r} 0535 \\ + 6220 \\ \hline \overline{10055} \end{array}$$

$$= (0056)_7^4 \quad \text{Нечётное}$$

нк

$$3) A) (520311)_6^6 + (054543)_6^6 =$$

$$\begin{array}{r} 520311 \\ + 054543 \\ \hline \overline{1015254} \end{array}$$

$$= (015254)_6^6$$

$$6) (20122)_3^5 + (0120)_3^4 = (20122)_3^5 + (00120)_3^5$$

$$\begin{array}{r} 20122 \\ + 0120 \\ \hline \overline{21012} \end{array}$$

$$= (21012)_3^5 \quad \text{Нечётное}$$

$$3) (54321)_5^5 - (02013)_5^5 = (54321)_5^5 + (42432)_5^5$$

$$\begin{array}{r} 54321 \\ + 42432 \\ \hline \times 02303 \end{array} = (02303)_5^5$$

Неса прекорачаве!

$$5) (01101)_2^5 - (11010)_2^5 =$$

$$\begin{array}{r} 01101 \\ - 11010 \\ \hline \times 10011 \end{array}$$

Прекорачаве! Резултата е извън диапазона на знака.

$$11) (FB76)_{16}^4 + (F255)_{16}^4 =$$

$$\begin{array}{r} FB76 \\ + F255 \\ \hline \times FEECB \end{array}$$

Прекорачаве! Е тук дълъг знак

$$f) (54321)_6^5 - (01234)_6^5 = (54321)_6^5 + (54322)_6^5$$

$$\begin{array}{r} 54321 \\ + 54322 \\ \hline \times 53043 \end{array}$$

$$= (53043)_6^5$$

Неса прекорачаве!

$$e) (F1BC9)_{16}^5 + (FE325)_{16}^5 =$$

$$\begin{array}{r} F1BC9 \\ + FE325 \\ \hline \times EFFE \end{array}$$

Прекорачаве! Е тук дълъг знак

Задача

4) А) $(0351)_6^4 + (6211)_6^4$, $k=13$ $(13)_{10} = (21)_6$

$$\begin{array}{r} 0351 \\ + 6211 \\ \hline 10002 \end{array} - (0002)_6 =$$

$$- (0002)_6 + (5535)_6$$

$$\begin{array}{r} 0002 \\ + 5535 \\ \hline 5541 \end{array}$$

$$= (55411)_6^4$$

Несо
упас(хмечка)

5) $(42032)_5^5 - (01130)_5^5$, $k=7$ $(7)_{10} = (12)_5$

$$\begin{array}{r} 42032 \\ - 01130 \\ \hline 40402 \end{array} (40402)_5 + (00012)_5 =$$

Несо преобразование

$$\begin{array}{r} 100012 \\ - 40414 \\ \hline \end{array}$$

$$= (404121)_5^5$$

Несо преобразование

5) А) $(73510)_8^5 + (74305)_8^5$

Знак: 7

$$\begin{array}{r} 3510 \\ + 4305 \\ \hline \end{array}$$

1) 0015 Прекончение! А В нешоне со се

найтице узвешак 46чубре

Б) $(0573A)_{16}^5 + (FA1E4)_{16}^5$

Знак: F

$$\begin{array}{r} A1E4 \\ - 573A \\ \hline \end{array}$$

$\approx 17 \approx 20$

Несо тирик!

$$= (F4AAA)_{16}$$

3) $(0573A)_{16}^5 - (FA1E4)_{16}^5 = (0573A)_{16}^5 + (OA1E4)_{16}^5$

ШАК: 0
 АР: $\begin{array}{r} 573A \\ + A1E4 \\ \hline F91E \end{array}$
 $= (0F91E)_{16}$ Неверно!

4) $(73510)_8^5 + (724305)_8^5 =$
 $\begin{array}{r} 73510 \\ + 74305 \\ \hline 70015 \end{array}$
 $= (70016)_8^5$ Неверно, нужно перепечатать!

5) $(0573A)_{16}^5 - (FA1E4)_{16}^5 = (0573A)_{16}^5 + (05E1B)_{16}^5$
 $\begin{array}{r} 0573A \\ + 05E1B \\ \hline 0B555 \end{array}$
 $= (0B555)_{16}$ Неверно, нужно перепечатать.

6) $(FA1E4)_{16}^5 - (OA73A)_{16}^5 = (FA1E4)_{16}^5 + (F58C5)_{16}^5$
 ~~$\begin{array}{r} FA1E4 \\ - F58C5 \\ \hline EFAA9 \end{array}$~~
 Прекрасно! Задача решена.

нк
в) $(74356)_8^5 + (07244)_8^5 =$

$$\begin{array}{r} 11 \\ 74356 \\ + 07244 \\ \hline 03622 \end{array}$$

$$= (03622)_8^5 \quad \text{Неск переноса}$$

нк
г) $(100101)_2^6 - (010111)_2^6 = (100101)_2^6 + (101001)_2^6$

$$\begin{array}{r} 100101 \\ + 101001 \\ \hline 0011110 \end{array}$$

Прекращение! 3 бдт знака.

нк
з) $(0F549)_{16}^5 - (F4EA3)_{16}^5 = (0F549)_{16}^5 + (OB15D)_{16}^5$

$$\begin{array}{r} 0F549 \\ - OB15D \\ \hline 1A6A6 \end{array}$$

Прекращение! 3 бдт знака.

6. а) $(F49C)_{16}^4 + (F8AE)_{16}^4 =$, нк

$$\begin{array}{r} F49C \\ - F8AE \\ \hline 1ED4A \end{array}$$

Прекращение! Е юнг группа 3 бдт знака

б) $(05214)_8^5 - (07253)_8^5, k = 31 \quad (31)_{10} - (37)_8$

$$\begin{array}{r} 05214 \\ - 07253 \\ \hline 75741 \end{array}$$

$$\begin{array}{r} 75741 \\ + 37 \\ \hline 76000 \end{array}$$

$$= (76000)_8^5 \quad \text{Неск переноса}$$

$$B) (10101110)_2 = (11010111)_2^3, \text{ т.к. } 3AB.$$

$$= (10101110)_2^3 + (01101111)_2^3$$

Знак: 0

AB: 10101111

$$\begin{array}{r} - \\ 10101111 \\ \hline 01101111 \end{array}$$

$$= (00101001)_2^3 \text{ Неверно}$$

4) Определите значение выражения

3AB

$$A) (031)_4 = +(31)_4 = 3 \cdot 4 + 1 = +13$$

$$B) (521)_6 = -(21)_6 = -(2 \cdot 6 + 1) = -13$$

$$C) (11011)_2 = -(1011)_2 = -(8 + 2 + 1) = -11$$

$$D) (0220)_3 = +(220)_3 = 2 \cdot 3^2 + 2 \cdot 3 = 24$$

4E.

$$E) (0301)_5 = +(301)_5 = 3 \cdot 5^2 + 1 = +76$$

$$F) (21021)_3 = -(1201)_3 = -(3^3 + 2 \cdot 3^2 + 1) = -46$$

$$G) (632)_2 = -(34)_2 = -(3 \cdot 2 + 4) = -25$$

$$H) (0542)_9 = +(542)_9 = 5 \cdot 9^2 + 4 \cdot 9 + 2 = 443$$

13 A) $(64321)_5 = + (4321)_5 = 4 \cdot 5^3 + 3 \cdot 5^2 + 2 \cdot 5 + 1 = 936$

B) $(42432)_6 = -5^4 + 2 \cdot 5^3 + 4 \cdot 5^2 + 3 \cdot 5 + 2 = -258$

C) $(3001)_4 = -4^3 + 1 = -63$

D) $(052)_7 = + (52) = 5 \cdot 7 + 2 = 37$

Guarac

4 A) $(0331)_4$, $k = 22$

$$= + (331)_u = \begin{array}{r} 3 \\ - 4^2 + 34 + 1 = 61 \\ - 22 \\ \hline + 39 \end{array}$$

$$5) \quad (5251)_6, \quad k=14$$

$$= -6^3 + 2 \cdot 6^2 + 5 \cdot 6 + 1 = -113$$

~~-14~~

~~-127~~

ЗАВАЖДИ в якості

5) A) $(1011101)_2^2 + (1010110)_2^2 =$

3AB1

34612 1

НВ : ОЛАЛСЛ

4 0101110

110011

$$= (1110011)_2$$

$$= -(\wedge\wedge\circ\circ\wedge\wedge)_2 = \underline{-51}$$

HK: Л В О В В В В
С В А В А В
В О О О О В

Apex spawneite

nL:

Preparation.

$$5) (FFA81)_{16}^5 - (00B8C)_{16}^5 = (FFA81)_{16}^5 + (FOB8C)_{16}^5 \quad \text{MASHE}$$

$$= (FFA81)_{16}^5 + (FF473)_{16}^5$$

3AB

3MAX: F, 1

A3: F A81

+ 0B8C

1 060D

N peresopruvete!

nk: 1

$$\begin{array}{r} \text{FFA81} \\ + \text{FF473} \\ \hline \text{X FEEF4} \end{array}$$

$$= (FEEF5)_{16}^5$$

$$= -(110A)_{16}^5 = -(16^3 + 16^2 + 10) = -\underline{\underline{4362}}$$

nk FFA81

X FF474

$$\begin{array}{r} \text{X FEEF5} \\ + (FEEF5)_{16}^5 : -16^4 + 16^3 + 16^2 + 16 + 16 \cdot 15 + 5 \\ = -\underline{\underline{4363}} \end{array}$$

⑤ Kôg 8421

$$1) \text{ A) } 6841 + 2893 = + (6841 + 2893) \quad 6841$$

$$+ 2893$$

$$\begin{array}{r} 01101000000100010001 \\ + 00101000100100110011 \\ \hline 0 \quad 1 \quad 0 \quad 0 \quad 0 \\ 1001000011010100 \\ 0 \quad 0 \quad 1 \quad 0 \quad 0 \\ 0000 + 0110 + 0110 + 0110 \\ \hline 0001011100110100 \\ 3 \quad 7 \quad 3 \quad 4 \quad + 9734 \\ \hline \end{array}$$

$$5) -23942 - 5189 = -23942 + (-5189) = -(23942 + 5189)$$

$$\begin{array}{r}
 0010\ 0011\ 1000\ 0100\ 0000 \\
 + 0001\ 0011\ 1000\ 0001\ 0000 \\
 \hline
 0\ 0\ 0\ 0\ 0
 \end{array}
 \quad
 \begin{array}{r}
 23942 \\
 + 5189 \\
 \hline
 29131
 \end{array}$$

$$\begin{array}{r}
 0010\ 1000\ 1010\ 1100\ 1011 \\
 0\ 0\ 1\ 1\ 1\ 0 \\
 \hline
 0000\ + 0000\ + 0000\ + 0000\ + 0000 \\
 \hline
 0010\ 1001\ 0001\ 0011\ 0001
 \end{array}$$

$$\begin{array}{r}
 2\ 9\ 1\ 3\ 1 \\
 = -29131
 \end{array}$$

B)
$$7418 + 3705 = + (7418 + 3705)$$

$\overset{(n=6)}{7418}$	$+ 3705$	$\underline{\underline{+ 3705}}$	7418
0000	0110	0110	0110
+ 0000	0010	0010	0010
$\underline{0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 0}$			
0000	1010	1010	0100
0	1	1	0
+ 0000	+ 0110	+ 0110	+ 0000
$\underline{0 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0}$			
0001	0100	0001	0100
1	1	1	2
$\underline{\underline{+ 11127}}$			

$$\Gamma) -259 - 948 = -259 + (-948) = - (259 + 948)$$

$$\text{II) } 8379 + 8257 = + (8379 + 8257)$$

$$\begin{array}{r} 8379 \\ - 8257 \\ \hline 16576 \end{array}$$

$$\begin{array}{r} 1000 \ 0011 \ 0001 \ 1001 \\ + 1000 \ 0010 \ 0101 \ 0111 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \quad 0 \quad 1 \quad 0 \\ 0000 \ 0101 \ 0111 \ 0000 \\ \hline \end{array}$$

Прекорачење! $P_4 = 1$

$$\text{f) } 1275 - 452 = 1275 - (-452) = + (1275 - 452)$$

$$\begin{array}{r} 0001 \ 0010 \ 0011 \ 0101 \\ - 0000 \ 0100 \ 0101 \ 0010 \\ \hline 0 \quad 1 \quad 0 \quad 0 \quad 0 \\ 0000 \ 1110 \ 0010 \ 0011 \end{array}$$

$$\begin{array}{r} 1275 \\ - 452 \\ \hline 823 \end{array}$$

$$\begin{array}{r} 0000 \ - 0000 \ 0000 \ 0000 \\ \hline 0000 \ 1000 \ 0010 \ 0011 \\ 0 \quad 8 \quad 2 \quad 3 \end{array}$$

$$\begin{array}{r} + 823 \\ \hline \end{array}$$

$$\text{e) } 2369 - 4257 = 2369 + (-4257) = - (4257 - 2369)$$

$$\begin{array}{r} 0100 \ 0010 \ 0101 \ 0111 \\ - 0010 \ 0011 \ 0110 \ 1001 \\ \hline 0 \quad 1 \quad 1 \quad 1 \quad 0 \\ 0001 \ 0010 \ 0110 \ 1110 \\ - 0000 \ 0110 \ 0010 \ 0000 \\ \hline 0000 \ 0000 \ 1000 \ 1000 \\ 1 \quad 8 \quad 8 \quad 8 \end{array}$$

$$\begin{array}{r} 4257 \\ - 2369 \\ \hline 1888 \end{array}$$

$$\begin{array}{r} - 1888 \\ \hline \end{array}$$

$$\text{III) } +2832 + 9627 + (9627 - 2832)$$

9627	
- 2832	
<hr/>	
6795	

1001 0000 0010 0000
 - 0000 1000 0000 0000

 0 1 1 0 0
 0110 1101 1111 0101
 0000 - 0100 - 0000

 0000 0110 1001 0000
 6 7 9 5 + 6795

$$3) (-5372 + 4913) = - (5372 - 4913)$$

5372	
- 4913	
<hr/>	
459	

1001 0000 0000 0000
 - 0000 1001 0000 0000

 0 1 0 1 0
 0000 1001 0000 0000
 0000 - 0100 - 0000

 0000 0100 1001
 0 4 5 9 - 459

$$\text{II) } 9814 - 6925 = 9814 + (-6925) = + (9814 - 6925)$$

9814	
- 6925	
<hr/>	
2889	

1001 0000 0010 0000
 - 0000 1000 0000 0000

 0 1 1 1 0
 0010 1110 0110 0010
 0000 - 0100 - 0000

 0010 1000 1000 1001
 2 8 8 9 + 2889

⑥ log 6иник 3

A) $-2956 - 5678 = -2956 + (-5678) = -(5678 + 2956)$

$$\begin{array}{r}
 1000 \quad 1000 \quad 1000 \quad 1000 \quad 5678 \\
 + 0100 \quad 1100 \quad 0000 \quad 1001 \\
 \hline
 1100 \quad 0100 \quad 1000 \quad 1001 \quad + 2956 \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 0010 \rightarrow 0110 \rightarrow 0011 \rightarrow 0100 \\
 + 1101 \quad 0011 \quad 0011 \quad 0011 \\
 \hline
 0011 \quad 1001 \quad 0110 \quad 0111 \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 8 \quad 6 \quad 3 \quad 4 \quad -8634 \\
 \hline
 \end{array}$$

B) $4051 + 294 = +(4051 + 294)$

$$\begin{array}{r}
 0000 \quad 0000 \quad 0000 \quad 0000 \quad 4051 \\
 + 0000 \quad 0000 \quad 1100 \quad 0111 \\
 \hline
 0000 \quad 0000 \quad 1100 \quad 0111 \quad + 294 \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 0010 \rightarrow 1001 \rightarrow 0100 \rightarrow 0011 \\
 + 1010 \quad 1001 \quad 0100 \quad 0011 \\
 \hline
 0011 \quad 0100 \quad 0110 \quad 0110 \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 4 \quad 3 \quad 4 \quad 5 \quad +4345 \\
 \hline
 \end{array}$$

C) $1721 + 8539 = +(1721 + 8539)$

$$\begin{array}{r}
 0100 \quad 1010 \quad 0101 \quad 0100 \quad 1721 \\
 + 1000 \quad 1000 \quad 0110 \quad 1100 \\
 \hline
 1100 \quad 0010 \quad 1100 \quad 0000 \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 1 \quad 0 \quad 1 \quad 0 \\
 \hline
 0000 \quad 0010 \quad 1100 \quad 0000
 \end{array}$$

Прекращение!
 $P_4 = 1$

$$r) - 352 - 8139 = -352 + (-8139) = -(8139 + 352)$$

$$\text{D) } 5321 - 5395 = 5321 + (-5395) = -(5395 - 5321) = \\ = -(5395 + (-5321)) = -((05395)_{\text{pr}} + (-05321)_{\text{pr}})$$

$(B)_{pc}$:	VV00	CCVV0	CVV0	VCV0	CCV0	CVV0	CCV0
$(-B)_{pc}$:	CCVV	VV00	VCCV	VCV0	CCV0	VV00	CCV0
$(A)_{pc}$:	VV00	CCVV0	CVV0	VCV0	CCV0	VV00	CCV0
	A	A	A	A	A	A	C
	0000	0000	0000	0111	0111	0100	0100
	+ VV00						
	000N	000V	000V	1010	1010	011V	011V
	0	0	0	7	4		-74

$$\text{5) } \begin{matrix} (n=5) \\ 6841 - 2053^2 + (6841 + (-2053)) = \\ = + ((06841)_B + (-02053)_B) \end{matrix}$$

$$\begin{array}{r} (\bar{B})_B: \quad \underline{\underline{00111\ 01000\ 11000\ 01111\ 01111}} \\ (-\bar{B})_B: \quad \underline{\underline{11000\ 01011\ 10110\ 00110\ 00110}} \\ (\bar{A})_B: + \underline{\underline{00111\ 10011\ 11010\ 01111\ 01111}} \\ \hline \begin{array}{c} A \\ + \\ 00000 \\ + 00111 \\ \hline 00111 \end{array} \quad \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ \hline 4 \end{array} \quad \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ \hline 7 \end{array} \quad \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ \hline 4 \end{array} \quad \begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \\ \hline 8 \end{array} \\ \hline + 4748 \end{array}$$

$$\begin{array}{r} e) -3219 + 1853^2 - (3219 - 1853) = \\ = - (3219 + (-1853)) = - ((03219)_B + (-01853)_B) \end{array}$$

$$\begin{array}{r} (\bar{B})_B: \quad \underline{\underline{00111\ 01000\ 11000\ 10000\ 01111}} \\ (-\bar{B})_B: \quad \underline{\underline{11000\ 10111\ 01010\ 00110\ 00110}} \\ (\bar{A})_B: + \underline{\underline{00111\ 01110\ 10110\ 00110\ 00110}} \\ \hline \begin{array}{c} A \\ + \\ 00000 \\ + 00111 \\ \hline 00111 \end{array} \quad \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ \hline 1 \end{array} \quad \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ \hline 3 \end{array} \quad \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ \hline 6 \end{array} \quad \begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \\ \hline 6 \end{array} \quad -1366 \end{array}$$

$$44) -1835 + 4923 = + (4923 - 1835) = + (4923 + (-1835))$$

$$= + ((04923)_{\text{prc}} + (-01835)_{\text{prc}})$$

(B) _{pk} :	00111	01000	10111	01101	01001	01110	00011
(-B) _{pk} :	11000	01100	01110	00100	10010	11000	00000
(A) _{pk} :	+ 00111	01111	10111	01101	01001	01110	
	1	1	1	0	0	0	
	00000	00111	00000	11110	11110		
	+00111	+00111	+00111	+11001	+11001		
	00111	01110	00111	10111	10111		
	0	3	0	8	8		+3088

7) Множение неизвичайных дробей

$$\boxed{1)} T \cdot S = N = 70 = (0100 \ 0110)_2 \\ P = 51 = (0011 \ 0011)_2$$

кодик	C	A	P	P ₂	результат
	0	0000 0000	0011 0011		00110011
1.	0	+ 0100 0110 0100 0110			P ₂ : 1 \Rightarrow A + N \Rightarrow A
2.	0	0011 0011	0000 1001		CAP \rightarrow
3.	0	+ 0100 0110 0100 0110			P ₂ : 1 \Rightarrow A + N \Rightarrow A
4.	0	0011 0011	1000 1100		CAP \rightarrow
5.	0	0000 1001	0100 0110		P ₂ : 0 \Rightarrow CAP \rightarrow
6.	0	+ 0100 0110 0100 0110			P ₂ : 1 \Rightarrow A + N \Rightarrow A
7.	0	0011 0011	1100 0000		CAP \rightarrow
8.	0	0000 1001	1100 0000		P ₂ : 0 \Rightarrow CAP \rightarrow

$$(0000 \ 1001 \ 1100 \ 0011)_2^{16} = 2048 + 1024 + 256 + 128 + \\ 64 + 32 + 16 + 2 = \underline{\underline{3570}}$$

$$b) 207 \cdot 43 = M + 207 = (\Lambda \Lambda 00 \Lambda \Lambda \Lambda),_2$$

$$P \cdot 43 = (0010 \Lambda 011)_2$$

кодик	C	A	P	P_0	кошеникар
	0	0000 0000	0010 1011		001011
		+ 1100 1111			$P_0 = A \Rightarrow A + H \rightarrow A$
1	0	1100 1111			
	0	0110 0111	1001 0101		$CAP \rightarrow$
		+ 1100 1111			$P_0 = A \Rightarrow A + H \rightarrow A$
2	1	0011 0110			
	0	1001 1011	0100 1010		$CAP \rightarrow$
3.	0	0100 1011	1010 0101		$P_0 = O \Rightarrow CAP \rightarrow$
		+ 1100 1111			$P_0 = A \Rightarrow A + H \rightarrow A$
4.	1	0001 1100			
	0	1000 1100	0101 0010		$CAP \rightarrow$
5.	0	0100 0010	0010 1001		$P_0 = D \Rightarrow CAP \rightarrow$
		+ 1100 1111			$P_0 = A \Rightarrow A + H \rightarrow A$
6.	1	0001 0110			
	0	1000 1011	0001 1010		$CAP \rightarrow$
7.	0	0100 0010	0001 1010		$B = O \Rightarrow CAP \rightarrow$
8	0	0010 0100	1100 1010		$B = O \Rightarrow CAP \rightarrow$
$(0010 0100 1100 0101)^{16} = 2^{13} + 2^9 + 2^7 + 2^6 + 2^2 + 1 = 89 = 1$					
	13	9	76	2	

$$b) 28 \cdot 19 = M \cdot 28 = (0001 \text{ V}000 \text{ A}A00)_2^8$$

$$P \cdot 19 = (0001 \text{ V}000 \text{ CC}A1)_2^8$$

	C	A	P	T	Kombinatjonsfall
	0	0000 0000	0000 V000	0000 A	
1.	0	+ 0001 1000 +	0000 V000	0000 A	$P_0: 1 \rightarrow A + H \rightarrow A$
	0	0000 1000	0000 V000	0000 A	$CAP \rightarrow$
	0	0000 0000	0000 V000	0000 A	
2	0	0101 0100	0101 0100	0101 0100	$P_0: 1 \rightarrow A + H \rightarrow A$
	0	0101 0100	0101 0100	0101 0100	$CAP \rightarrow$
3	0	0000 0000	0000 0000	0000 0000	$B_3: 0 \rightarrow CAP \rightarrow$
4	0	0000 0000	0000 0000	0000 0000	$B_3: 0 \rightarrow CAP \rightarrow$
	0	0000 0000	0000 0000	0000 0000	
5.	0	0100 0100	0100 0100	0100 0100	$P_2: 1 = 2A + H \rightarrow A$
	0	0100 0100	0100 0100	0100 0100	$CAP \rightarrow$
6	0	0000 0000	0000 0000	0000 0000	$P_0: 0 \rightarrow CAP \rightarrow$
f.	0	0000 0000	0000 0000	0000 0000	- - -
8	0	0000 0000	0000 0000	0000 0000	- - -

$$(0000 \text{ V}000 \text{ A}A00 \text{ CC}A1)_2^{16} = 2^9 + 2^4 + 2^2 = 512 + 16 + 4 = 532$$

532

⑧ Минимизација означетих драгеба

1) A) $-g_A \cdot 22 =$

$$\begin{aligned} I \text{ начин} \quad -M &= g_A \cdot (0101 1011)^8 \\ M &= -g_A \cdot (1010 0101)^8 \\ P &= 22 \cdot (0001 0110)_2 \end{aligned}$$

	A		P	P_1	P_{-1}	кошт
1.	0000 0000	0001 0110	0000 1011	0	0	0
2.	0000 0000	0000 1011	0000 1011	0	0	$P_0 P_{-1} = 00 \Rightarrow APP_{-1} \rightarrow$
	+ 0101 1011					$P_3 P_{-1} = 10 \Rightarrow A - N \rightarrow A$
3.	0000 0000	0000 1011	0000 0101	1	1	$APP_{-1} \rightarrow$
	+ 1010 0101					$P_3 P_{-1} = 11 \Rightarrow APP_{-1} \rightarrow$
4.	0000 0000	0000 1011	0000 0010	1	1	$APP_{-1} \rightarrow$
	+ 1010 0101					$P_3 P_{-1} = 01 \Rightarrow A + N \rightarrow A$
5.	0000 0000	0000 1011	0000 0000	0	0	$APP_{-1} \rightarrow$
	+ 0101 1011					$P_3 P_{-1} = 10 \Rightarrow A - N \rightarrow A$
6.	0000 0000	0000 1011	0000 0000	1	1	$APP_{-1} \rightarrow$
	+ 1010 0101					$P_3 P_{-1} = 01 \rightarrow A + N \rightarrow$
7.	0000 0000	0000 1011	0000 0000	0	0	$APP_{-1} \rightarrow$
	+ 1010 0101					$P_3 P_{-1} = 00 \Rightarrow APP_{-1} \rightarrow$
8.	0000 0000	0000 1011	0000 0000	0	0	-11-

$$(1111 1000 0010 1110)_2^{16} = -2^{11} + 2^5 + 2^3 + 2^2 + 2 = -2002$$

$$\text{II} \quad M = -gA = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}_2^6 = \begin{pmatrix} 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{pmatrix}_2^{10}$$

$$\begin{array}{r} 0001000 \\ \underline{00+1-1} \\ 001000 \end{array}$$

k	(a_{k+1}, a_k)	v_k	$M \ll 2k$	$(M \ll 2k) \cdot v_k$
0	$(-1, 0)$	+2	AAA AAAA VVV CVCV	0000 0000 0000 VVVV VVVV 0000 +
1	$(+1, 0)$	+2	AAA AAA0 VVV0 VVV0 VVV CVCV VVV VVV	0000 0000 0000 +
2	$(+1, -1)$	+1	AAA AA0 VVV0 CCCC VVV CVCV VVV VVV	0000 0000 0000 +
3	$(0, 0)$	0	CCCC CCCC VVV VVV	0000 0000 0000 X 1111 1000 0110 1110

$$(\begin{smallmatrix} 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \end{smallmatrix})_{\frac{1}{2}}^{16} = -\underline{\underline{2002}}$$

$$b) 10^3 \cdot (-13)_2$$

I Нашли $M = 10^3 = (0111001111)_2$ $-M = (100110001)_2$
 $P = -13 = (1111100111)_2$

Ходы	A	P P_1	P_{-1}	Следующие
	0000 0000	VVCC VVV	0	$P, P_{-1} = A \rightarrow A - M \rightarrow A$
1.	1001 1001			
2.	1001 1001	CCVV CCVV	1	$AP P_1 \rightarrow$
3.	0110 0110	VVVA VVVA	1	$P, P_{-1} = M \rightarrow AP P_1 \rightarrow$
4.	0110 0110	VVVA VVVA	0	$P, P_{-1} = 01 \Rightarrow A + M \rightarrow A$
5.	0110 0110	CVCC CVCC	0	$AP P_1 \rightarrow$
6.	0110 0110	VVVA VVVA	0	$00 \Rightarrow AP P_1 \rightarrow$
7.	0110 0110	VVVA VVVA	1	$A \rightarrow A - M \rightarrow A$
8.	0110 0110	VVVA VVVA	1	$AP P_1 \rightarrow$
	$(VVVA, 1010, 1100, 0101)_2^{16} = -1339$			

$$\text{II начн} \quad \begin{array}{l} \text{AAA} \\ \underline{\text{000-1}} \end{array} \quad \begin{array}{l} \text{0011} \\ \underline{\text{0+10-1}} \end{array} \quad M = 100 \cdot (0000 \ 0000 \ 0111 \ 0 \ 0111)_2^{16}$$

k	(a_{k+k_1}, a_{k_2})	μ_k	$M \leq 2k$	$(M \leq 2k) \ \mu_k$
0	(0, -1)	-1	0000 0000 01001111	AAA AAA 1001 1001
1	(0, +1)	+1	0000 0001 1001 1100	0000 0001 1001 1100
2	(0, -1)	-1	0000 0110 0111 0000	0000 1001 1001 0000
3	(0, 0)	0	0001 1001 1000 0000	0000 0000 0000 0000

$$\begin{array}{r} \text{AAA} \ \text{AAA} \ \text{1001} \ \text{1001} \\ + \text{0000} \ \text{0001} \ \text{1001} \ \text{1001} \\ \hline \end{array}$$

$$\begin{array}{r} \cancel{\text{0000}} \ \cancel{\text{0001}} \ \text{0011} \ \text{0101} \\ + \text{1111} \ \text{1001} \ \text{1001} \ \text{0000} \\ \hline \text{1111} \ \text{1010} \ \text{1100} \ \text{0101} \end{array}$$

$$(1111 \ 1010 \ 1100 \ 0101)_2^{16} = -2^{11} + 2^9 + 2^7 + 2^6 + 2^2 + 1 = \\ = \underline{-1339}$$

III Нашит

двоич	A	P	P-1	кодировка
4.	0000 0000	1111 0011	0	$MNO \Rightarrow A + 1 + 1M \rightarrow A$
	+1000 1001			
3.	1001 1001	0111 1100	1	$APP_1 \rightarrow (2^x)$
	+1100 0110			$001 \Rightarrow A + 1 + 1M \rightarrow A$
2.	1010 0000	0101 1011	0	$APP_1 \rightarrow (2^x)$
	+1000 1001			$MNO \Rightarrow A + 1 + 1M \rightarrow A$
1.	1010 1001	0101 0111	1	$APP_1 \rightarrow (2^x)$
	+1100 0110			$APP_1 \rightarrow (2^x)$
0.	1111 0011	1100 0110	1	$APP_1 \rightarrow (2^x)$
	+1000 1001			

$$(1111 0011 1100 0110)_2 = -1339^{16}$$

$$B) (-46)_{12} =$$

I Нашит

$$M = 46 = (0010 \text{ } 1100)_2^8$$

$$M = -46 = (\overline{1101} \text{ } 0010)_2^{16}$$

$$P = 12 = (0000 \text{ } 1100)_2^5$$

коды	A	P	P-1	результат
1.	0000 0000	0000 1100	0	0000000000000000
2.	0000 0000	0000 0000	0	0000000000000000
3.	0000 0000	0000 0000	1	10 → A-H → A
4.	0000 1011	1000 0000	1	11 → APP-1 →
5.	1101 1101	0000 0000	0	01 → A + H → A
6.	1110 1101	1100 0000	0	APP-1 →
7.	1111 1011	1011 0000	0	00 → APP-1 →
8.	1111 1101	1101 1000	0	-11-

$$(1111 \text{ } 1101 \text{ } 1011 \text{ } 1000)_2^{16} = -2^{10} + 2^8 + 2^7 + 2^6 + 2^4 + 2^3 = -552$$

II Нашит

$\begin{array}{|c|c|} \hline 0000 & 1100 \\ \hline 090+1 & 0-100 \\ \hline \end{array}$

$\mu = -4G = (1111 \ 1111 \ 1101 \ 1000)_2^{16}$

k	(a_{k+1}, a_k)	W_k	H_{k+2k}	$(H_{k+2k}) W_k$
0	(0, 0)	0	1111 1111 1101 1000	0000 0000 0000 0000
1	(0, +1)	-1	1111 1111 0000 1000	0000 0000 1111 1000
2	(0, -1)	+1	1111 1111 1000 0000	0000 0000 1111 1000
3	(0, 0)	0	1111 0000 1000 0000	0000 0000 0000 0000

$$(1111 \ 1101 \ 1101 \ 1000)_{2^{16}} = -2^{10} + 2^8 + 2^7 + 2^6 + 2^4 + 2^3 =$$

$$= \underline{\underline{-552}}$$

III Haupt

Moment	A	P	P. ₁	reduz. P.
4.	0000 0000	0000 1100	0	unmöglich
3	0000 0000	0000 0000	0	$000 \rightarrow AP_{-1} \rightarrow (2x)$
2.	$\begin{matrix} 00 \\ 00 \\ 00 \\ 00 \end{matrix}$	$\begin{matrix} 0000 \\ 0000 \end{matrix}$	1	$110 \rightarrow A + (-1)M \rightarrow A$
1.	$\begin{matrix} 1100 \\ 1100 \end{matrix}$	$\begin{matrix} 0000 \\ 0000 \end{matrix}$	1	$APP_{-1} \rightarrow (2x)$
0.	$\begin{matrix} 1100 \\ 1100 \end{matrix}$	$\begin{matrix} 0000 \\ 0000 \end{matrix}$	0	$000 \rightarrow APP_{-1} \rightarrow (1x)$

$$(11111 \ 1101 \ 1101 \ 1100)^T = -552$$

Г) (-28) $\wedge \wedge \wedge$

$$\text{Измен: } -M = 28 = (0001 \wedge \wedge 00)_2$$

$$M = -28 = (110 0100)_2$$

$$P = M \wedge = (0110 1111)_2$$

Коды	A	P	P.A	коментарий
	0000 0000	0110 1111	0	без остатка
1.	+0001 1100	0000 1111	1	$A \rightarrow A - M \rightarrow A$
2.	0001 1100	0000 1111	1	$A \rightarrow APP_1 \rightarrow$
3.	0000 1111	0000 1111	1	$M \rightarrow APP_1 \rightarrow$
4.	0000 0001	0110 0001	1	$M - 1 \rightarrow$
	+1110 0100	0000 1111	0	$2A \rightarrow A + M \rightarrow A$
5.	1110 0100	0000 1111	0	$APP_1 \rightarrow$
	+0001 1100	0000 1111	1	$A \rightarrow A - M \rightarrow A$
6.	*0000 1110	0000 1111	1	$APP_1 \rightarrow$
7.	0000 0001	1001 1000	1	$M \rightarrow APP_1$
	+1110 0100	0000 1111	0	$2A + M \rightarrow A$
8.	1110 0100	0001 1111	0	$APP_1 \rightarrow$
$(-1111 0011 1101 1100)_2^{16} = -2^{12} + 2^9 + 2^8 + 2^7 + 2^6 + 2^4 + 2^3 + 2^1$				
$= -3108$				

II Начин ОЛЛО ОЛЛО
19-III-2021

k	(a ₁₁ , a ₁₂)	v ₁	μ ₁₂ 2k	(μ ₁₂ 2k) · 16
0	(0, -1)	-1	AAA AAA MAO COV	AAA AAA COV 1100
1	(0, 0)	0	AAA AAA AOOA COO	0000 0000 0000 0000
2	(-1, +1)	-1	AAA AAA OAO COOC	0000 0000 0001 1100
3	(+1, 0)	+2	AAA AOOA COOC COOC	AAA COAO COOC COOC

$$(AAA \text{ OOA } MOA \text{ COV } 1100)_2^{16} = \underline{\underline{-3108}}$$

III 4акунт

номер	A	P	P-1	качедар
4	0000 COOC COOC 0000	0000 AAA AAA 0000	0	AAA → A + (-1)M → A
3.	COV VCO VCO VCO 0000 0000			
2.	VOC COOC COOC VOC	COV COV COV COV	A	M = A + (-1)M → (2x)
1.	COV VCO VCO VCO 0000 COOC	0000 VOC VOC 0000	A	10A = A + (-1)M → M
0.	COV COOC COOC COV AAA COOC	VOC VOC VOC VOC	0	A + (-1)M → (2x)

$$(AAA \text{ OOA } MOA \text{ COV } 1100)_2^{16} = \underline{\underline{-3108}}$$

II) 27. 17 =

$$\begin{array}{l} \text{Измен} M = 27 \cdot (0001 \text{ } 1011)_2 \\ R = 17 = (0001 \text{ } 0001)_2 \end{array} - M = 927 \cdot (1110 \text{ } 0101)_2$$

	A	P	R ₁	ЛОГИЧЕСКИЙ
1.	0000 0000 + 1010 0111	1000 1000	0	10 = A + M → A
2.	1000 1101 + 1010 0000	1000 1000	1	APP ₁ →
3.	0000 0000 + 1010 0000	0010 0000	0	00 = APP ₁ →
4.	1000 0000 + 1010 0000	1000 1000	0	00 = APP ₁ →
5.	0000 0000 + 1010 0000	0010 0000	1	10 = A - M → A
6.	1000 1101 + 1010 0000	1000 1000	1	APP ₁ →
7.	0000 0000 + 1010 0000	0010 0000	0	00 = APP ₁ →
8.	0000 0000 + 1010 0000	0010 0000	0	00 = APP ₁ →

$$(0000 \text{ } 0000 \text{ } 1010 \text{ } 0000 \text{ } 0000 \text{ } 0000 \text{ } 0000 \text{ } 0000)_2 = 2^{16} + 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 459$$

II Нашит

000A 003A
0041-1 0011-1

k	(a_{k+1}, a_k)	w_k	M<=2k	(M<=2k) w_k
0	(+1, -1)	+1	0000 0000 000A 1011	0000 0000 000A 1011
1	(0, 0)	0	0000 0000 0000 0000	0000 0000 0000 0000
2	(+1, -1)	+1	CCCC VCVV VCCV CCCC	CCCC VCVV VCCV CCCC
3	(0, 0)	0	0000 0000 1011 0000	0000 0000 1011 0000

$$= 0000 \ 0000 \ 1100 \ 1011$$

$$(0000 \ 0000 \ 1011 \ 0000)^{16}_2 = \underline{\underline{459}}$$

III Нашит

номер	A	P	P-1	коментарий
4	CCCC CCCC	V000 V000	0	0000A
3	+000A V000 WCVV V000 0000 0000			010 => A + (-1)M -> A
2	0000 CCCC V000 V000	C0V0 0100 V0C0 V0V0	0	APP-1 -> (2x)
1	+000A V000 0001 AA00 0000 00AA	00V0 0100 V0V0 V0VA	0	010 => A + (-1)M -> A
0	0000 CCCC V000 V000	V0V0 V0VA	0	APP-1 -> (2x)

$$(0000 \ 0000 \ 1011 \ 0000)^{16}_2 = \underline{\underline{459}}$$

$$5) (-6) \cdot 118 =$$

$$\text{Irraum} - M + G = (0000 \ 0110)_2^8$$

$$\mu = -6 = (1111 \ 1010)_2^8$$

$$P = 118 \cdot (0111 \ 0110)_2^6$$

	A	P	R ₁	Koeffizienten
1	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	0	00 → APP ₁ →
2	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	0	10 → A - M → A
3.	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	1	APP ₁ →
4.	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	1	11 → APP ₁ →
5.	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	0	APP ₁ →
6	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	1	10 → A - M → A
7.	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	1	11 → APP ₁ →
8.	0000 0000 0000 0000 +1000 0000	0110 0110 0000 1111 0011 1100 1111 0000	0	APP ₁ →
	(1111 1010 0011 1111) ₂	¹⁶ <u>-708</u>		

II Нашит

	(α_{k+1}, α_k)	w_k	μ_{k+2k}	$(\mu_{k+2k}) w_k$
0	(1, 0)	+2	AAA AAA AAA AAA	CVV CVV CVV CVV
1	(+1, 0)	+2	AAA AAA AAA AAA	CCV CCV CCV CCV
2	(0, -1)	-1	AAA AAA AAA AAA	CCC CCC CCC CCC
3	(+1, 0)	+2	AAA AAA CCC VVV	CCV CCV VVV VVV

$$(AAA AAA AAA AAA)_{\frac{1}{2}}^{16} = \underline{-708}$$

III Нашит

дроби	A	P	P ₋₁	равенства
4	CCW CCW CVV CVV	CVV VVV	CVV	$CVV \Rightarrow A + (-2)U \rightarrow A$
3	CVV CVV CVV CCC VVV CCC	VVV VVV	V	$APP_1 \rightarrow (2x)$
2	CVV VVV VVV VVV VVV VVV	VVV VVV	O	$0A \Rightarrow A + (+2)U \rightarrow A$
1	CVV CCC VVV CCC CVV CCC	VCC VCC	A	$APP_{-1} \rightarrow (2x)$
0	CVV VVV CVV VVV VVV VVV	CVV VCC	O	$APP_{-1} \rightarrow (2x)$

$$(AAA AAA AAA AAA)_{\frac{1}{2}}^{16} = \underline{-708}$$

$$e) 70 \cdot 51 =$$

Итак $M = 70 - (01000 \Phi 110)_2^8$,
 $-M = -70 - (10111 10110)_2^8$,
 $P = 51 = (00111 00111)_2^8$

EXP	A	B	P _A	каснРР
	0000 0000	0011 0011	0	000000
	+10111 10110			$10 \rightarrow A - M \rightarrow A$
1.	1111 1111	0001 1001	1	APP. _A →
2.	1110 1110	1000 1100	1	$M \rightarrow APP_1 \rightarrow$
	+0110 0110			$01 \rightarrow A + M \rightarrow A$
3.	*0011 0100	0001 1010	0	APP. _A
	0001 1010	0100 0100	0	$01 \rightarrow APP_1 \rightarrow$
4.	0000 1101	0110 0100	0	$10 \rightarrow APP_1 \rightarrow$
	+10111 10110			$10 \rightarrow A - M \rightarrow A$
5.	1100 0111	1000 0100	1	APP. _A →
	1110 0011	1001 0100	1	$M \rightarrow APP_1 \rightarrow$
	+0100 0110			$01 \rightarrow A + M \rightarrow A$
7.	*0011 0111	1110 0100	0	APP. _A →
	0001 1011	1110 0100	0	
8.	0000 1101	1111 0010	0	$00 \rightarrow APP_1 \rightarrow$
	(0000 1101 1111 0010) ₂ ¹⁶ = <u>3570</u>			

II Нашит

0011 0011
 $0+10-1, 0+10-1$

k	(a_{k+1}, a_k)	θ_k	M_{k+2k}	$(M_{k+2k})_{ik}$
0	(0, -1)	-1	0000 0000 0000 0000	0000 0000 1011 1010
1	(0, +1)	+1	0000 0000 1000 1000	0000 0000 1001 1000
2	(0, -1)	-1	0000 0000 0000 0000	0000 1011 1010 0000
3	(0, +1)	+1	0000 0000 1000 1000	0000 0000 1001 1000

$$(0000 \text{ 1101 } 1111 \text{ 0010})_2^{16} = \underline{\underline{3570}}$$

$$0000 \text{ 1101 } 1111 \text{ 0010}$$

III Нашит

Шифр	A	P	P_{-1}	Коментарий
4	0000 0000	1100 0100	0	00000000
3	$\begin{array}{r} +1011 \\ 1010 \end{array}$	1100 0100	$\begin{array}{r} 1 \\ 1 \end{array}$	$110 \Rightarrow A + (-1)H \rightarrow A$
2	1100 0100	0000 0000	$\begin{array}{r} 1 \\ 1 \end{array}$	$APP_1 \rightarrow (2x)$
1	0010 1000	0000 0000	0	$001 \Rightarrow A + (1)H \rightarrow A$
0	0000 1100	0000 0000	$\begin{array}{r} 1 \\ 1 \end{array}$	$APP_1 \rightarrow (2x)$

$$(0000 \text{ 1101 } 1111 \text{ 0010})_2^{16} = \underline{\underline{3570}}$$

⑨ Лекции по оценке проектов

$$\boxed{11} \text{ a) } 123 : 4 = \begin{array}{r} P: 123 = (0111 \ 1000)_2 \\ M = 4 = (0000 \ 0100)_2 \\ -M = -4 = (1111 \ 1100)_2 \end{array}$$

Коды	A	P	P ₀	Команды
1.	0000 0000 0000 0000 + 1111 1111 ————— 1111 1111	0000 0000 0000 0000 + 1111 1111 ————— 1111 1111	0000 0000 0000 0000 + 1111 1111 ————— 1111 1111	AP ← , A-M → A , A<0 , рестарт программы
2	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	AP ← , A-H → A A<0 , рестарт программы
3.	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	AP ← , A-N → A A<0 , рестарт программы
4.	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	AP ← , A-U → A AP = 0 ⇒ P ₀ = 1
5.	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	AP ← , -II -
6	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	1111 1111 1111 1111 + 1111 1111 ————— 1111 1111	AP ← , -II -

7	$\begin{array}{r} 0000 \cdot 0000 \\ + 11110 \cdot 11110 \\ \hline 1000000000 \end{array}$	$\begin{array}{r} 1000 \cdot 1000 \\ + 1000 \cdot 1000 \\ \hline 20000000 \end{array}$	$\begin{array}{r} 1000 \cdot 1000 \\ + 1000 \cdot 1000 \\ \hline 20000000 \end{array}$
8	$\begin{array}{r} 0000 \cdot 0000 \\ + 11111 \cdot 11111 \\ \hline 1000000000 \end{array}$	$\begin{array}{r} 0000 \cdot 0000 \\ + 11111 \cdot 11111 \\ \hline 2000000000 \end{array}$	$\begin{array}{r} 0000 \cdot 0000 \\ + 11111 \cdot 11111 \\ \hline 2000000000 \end{array}$

Компьютер: $P = (000 \wedge 1110) = \underline{\underline{30}}$

Автомат: $A = (0000 \wedge 0011) = \underline{\underline{3}}$

$$6) \begin{array}{l} AB = 12 \\ P = AB = (1000 \ 0011)_2 \\ M = 12 = (0000 \ 1100)_2 \\ N = 12 = (1100 \ 0100)_2 \end{array}$$

	A	P	P_0	Коментарий
1.	$\begin{array}{r} 0000 \\ 0000 \\ 1000 \\ + 0000 \\ \hline 1000 \end{array}$	$\begin{array}{r} 1000 \\ 0000 \\ 0000 \\ + 0000 \\ \hline 1000 \end{array}$	$\begin{array}{r} 1000 \\ 0000 \\ 0000 \\ + 0000 \\ \hline 1000 \end{array}$	Задача $AP \leftarrow A - H \rightarrow A$
2.	$\begin{array}{r} 0000 \\ 0000 \\ 0000 \\ + 0000 \\ \hline 0000 \end{array}$	$\begin{array}{r} 0000 \\ 0000 \\ 0000 \\ + 0000 \\ \hline 0000 \end{array}$	$\begin{array}{r} 0000 \\ 0000 \\ 0000 \\ + 0000 \\ \hline 0000 \end{array}$	$AP \leftarrow A - H \rightarrow A$
3.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	-II -
4.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$AP \leftarrow -II +$
5.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$AP \leftarrow , -II +$
6.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$AP \leftarrow , A - H \rightarrow A$
7.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$A \geq 0 \Rightarrow 1 \rightarrow P_0$
8.	$\begin{array}{r} 1111 \\ 0000 \\ + 1111 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$\begin{array}{r} 0000 \\ 1111 \\ + 0000 \\ \hline 1111 \end{array}$	$AP \leftarrow , A - H \rightarrow A$
				$A < 0, \text{редигирование}$

7.	$ \begin{array}{r} 0001\ 0001 \\ +1111\ 0010 \\ \hline 10\ 10\ 0000 \end{array} $	$ \begin{array}{r} 1000\ 0010 \\ +1000\ 0100 \\ \hline 1000\ 1010 \end{array} $	$R \leftarrow, A - H \rightarrow A$
8.	$ \begin{array}{r} 0000\ 1010 \\ +1111\ 0010 \\ \hline 1111\ 1100 \end{array} $	$ \begin{array}{r} 0000\ 1010 \\ +0000\ 1010 \\ \hline 0000\ 1010 \end{array} $	$A \leftarrow 0, I \rightarrow P_0$ $R \leftarrow, -H -$ $A < 0, \text{ рестартоваја}$

Компјутер: $P = (0000\ 1010) = \underline{\underline{10}}$

Одговарај: $A = (0000\ 1010) = \underline{\underline{11}}$

$$\begin{aligned} \text{B) } 99 : 33 &= P : 99 = (0110 \ 0011)_2 \\ M &= 33 = (0010 \ 0011)_2 \\ - N &= -33 = (1101 \ 1111)_2 \end{aligned}$$

напак	A	P	R _a	контрар
1.	$\begin{array}{r} 0000\ 0000 \\ + 1101\ 1111 \\ \hline 1110\ 0101 \end{array}$	$\begin{array}{r} 0000\ 0000 \\ + 1101\ 1111 \\ \hline 1110\ 0101 \end{array}$	$\begin{array}{r} 0000\ 0000 \\ + 1101\ 1111 \\ \hline 1110\ 0101 \end{array}$	AP ←, A-N→A
2.	$\begin{array}{r} 1110\ 0000 \\ + 1101\ 1111 \\ \hline 1001\ 1111 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	ACO, Регистрација
3.	$\begin{array}{r} 1110\ 0000 \\ + 1101\ 1111 \\ \hline 1001\ 1111 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	AP ←, -II-
4.	$\begin{array}{r} 1110\ 0000 \\ + 1101\ 1111 \\ \hline 1001\ 1111 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	-II-
5.	$\begin{array}{r} 1110\ 0000 \\ + 1101\ 1111 \\ \hline 1001\ 1111 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	AP ←, -II-
6.	$\begin{array}{r} 1110\ 0000 \\ + 1101\ 1111 \\ \hline 1001\ 1111 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	$\begin{array}{r} 1001\ 1111 \\ - 1101\ 1111 \\ \hline 0100\ 0000 \end{array}$	-II-

$\begin{array}{r} 00111 \\ + 11011 \\ \hline X 00011 \end{array}$	$\begin{array}{r} 1000 \\ + 0000 \\ \hline 1000 \end{array}$	$A^P = 1 - 11 -$
$\begin{array}{r} 00100 \\ + 11011 \\ \hline X 00001 \end{array}$	$\begin{array}{r} 0000 \\ + 0000 \\ \hline 0000 \end{array}$	$A^D = 0, 1 \rightarrow P_0$

Коммут: $P = (0000 \ 0011)_2 = \underline{\underline{3}}$

Обратн: $A = (0000 \ 0000)_2 = \underline{\underline{0}}$

10) Доведите обозначенных выражения

A) $-128 : 2 =$

$$\Phi = -128 = (1000 \ 0000)_2^8$$

$$M = 2 = (0000 \ 0010)_2$$

$$-2 = (1111 \ 1110)_2$$

кодик	A	P	P_0	кошештап
0	1111 1111	1000 00001		баштак
1.	$\begin{array}{r} 1111 1111 \\ + 0000 0010 \\ \hline 10000 0001 \end{array}$	0000 0001		$A + M \rightarrow$ НОХНЕШНД
	1111 1111	0000 00010		РЕСТАУРАЦИЯ
2.	$\begin{array}{r} 1111 1110 \\ + 10000 0010 \\ \hline 10000 0000 \end{array}$	0000 00100		$A + M \rightarrow A, AP_6 = 0, 1 \rightarrow P_0$
	0000 0000	0000 00101		
3.	$\begin{array}{r} 1111 1110 \\ + 1111 1110 \\ \hline 0000 0000 \end{array}$	0000 00100		$A - M \rightarrow$ НЕЧЛЕНШНД
	0000 0000	0000 00101		РЕСТАУРАЦИЯ
4. - 7.	0000 0000	0100 0000		$A - M \rightarrow$ НЕЧЛЕНШНД
8.	0000 0000	0100 0000		$AP \leftarrow$
Такимим: $P = -(0100 0000)_2^8 = -64$				
Основтак: $A = (0000 0000)_2^8 = 0$				

$$8) \quad A_03 : (-7) = \begin{matrix} P = A_03 = (0110 \quad 0111)_2 \\ M = 7 = (0000 \quad 0111)_2 \\ -7 = (1111 \quad 1001)_2 \end{matrix}$$

корак	A	P P ₀	кошт корака
1.	$\begin{array}{r} 0000 \quad 0000 \\ +1111 \quad 1001 \\ \hline 1111 \quad 1001 \end{array}$	$\begin{array}{r} 0110 \quad 0111 \\ 1100 \quad 1110 \end{array}$	AP ←
	$0000 \quad 0000$	$1100 \quad 1110$	$A+M \rightarrow$ неуспешна расческа
2.	$\begin{array}{r} 0000 \quad 0001 \\ +1111 \quad 1001 \\ \hline 1111 \quad 1010 \end{array}$	$\begin{array}{r} 1001 \quad 1100 \\ 1001 \quad 1100 \end{array}$	AP ←
	$0000 \quad 0001$	$1001 \quad 1100$	$A+M \rightarrow$ неуспешна расческа
3.	$\begin{array}{r} 0000 \quad 0011 \\ +1111 \quad 1001 \\ \hline 1111 \quad 1100 \end{array}$	$\begin{array}{r} 0011 \quad 1100 \\ 0011 \quad 1100 \end{array}$	AP ←
	$0000 \quad 0011$	$0011 \quad 1100$	$A+M \rightarrow$ неуспешна расческа
4.	$\begin{array}{r} 0000 \quad 0110 \\ +1111 \quad 1001 \\ \hline 1111 \quad 1111 \end{array}$	$\begin{array}{r} 0111 \quad 0000 \\ 0111 \quad 0000 \end{array}$	AP ←
	$0000 \quad 0110$	$0111 \quad 0000$	$A+M \rightarrow$ неуспешна расческа
5.	$\begin{array}{r} 0000 \quad 1100 \\ +1111 \quad 1001 \\ \hline 0000 \quad 0101 \end{array}$	$\begin{array}{r} 1110 \quad 0000 \\ 1110 \quad 0000 \end{array}$	AP ←
	$0000 \quad 0101$	$1110 \quad 0000$	$A+M \rightarrow A, 1 \rightarrow P_0$
6.	$\begin{array}{r} 0000 \quad 1011 \\ +1111 \quad 1001 \\ \hline 0000 \quad 0100 \end{array}$	$\begin{array}{r} 1110 \quad 0010 \\ 1110 \quad 0010 \end{array}$	AP ←
	$0000 \quad 0100$	$1110 \quad 0010$	$A+M \rightarrow A, 1 \rightarrow P_0$
7.	$\begin{array}{r} 0000 \quad 0011 \\ +1111 \quad 1001 \\ \hline 0000 \quad 0010 \end{array}$	$\begin{array}{r} 1100 \quad 0110 \\ 1100 \quad 0111 \end{array}$	AP ←
	$0000 \quad 0010$	$1100 \quad 0111$	$A+M \rightarrow A, 1 \rightarrow P_0$
8.	$\begin{array}{r} 0000 \quad 0101 \\ +1111 \quad 1001 \\ \hline 1101 \quad 1110 \end{array}$	$\begin{array}{r} 1000 \quad 1110 \\ 0000 \quad 1110 \end{array}$	AP ←
	$0000 \quad 0101$	$0000 \quad 1110$	$A+M \rightarrow$ неуспешна расческа

Комитик: $P = -(0000 \quad 1110) = -14$

Останак: $A = (0000 \quad 0101) = 5$

$$-123 : (-4) = P = 123 = (1000 \ 0101)_2$$

$$-M = 4 = (0000 \ 0100)_2$$

$$M : -4 = (1111 \ 1100)_2$$

B)

Кодик	A	P	P_0	результат
	1111 1111	1000	0101	1000101
	1111 1111	0000	1010	AP<
1.	+ 0000 0100			$A+M \rightarrow$ неуспешно
	0000 0011			
	1111 1111	0000	1010	редаукрайн
	1111 1110	0001	01100	AP<
	+ 0000 0100			
2.	0000 0010			$A+M \rightarrow -11-$
	1111 1110	0001	01100	редаукрайн
	1111 1100	0010	11000	AP<
	+ 0000 0100			
3.	0000 0000			$A-M \rightarrow -11-$
	1111 1100	0010	11000	-11-
	1111 1000	0101	0000	AP<
4.	+ 0000 0100			
	1111 1100	0101	11000	$A-M \rightarrow A, 1 \rightarrow P_0$
	1111 1000	0110	0010	AP<
5.	+ 0000 0100			
	1111 1100	1010	0011	$A-M \rightarrow A, 1 \rightarrow P_0$
	1111 1000	01100	0110	AP<
6.	+ 0000 0100			
	1111 1101	01100	0111	$A-M \rightarrow A, 1 \rightarrow P_0$
	1111 1010	11000	1110	AP<
7.	+ 0000 0100			
	1111 1110	11000	1111	$A-M \rightarrow A, 1 \rightarrow P_0$
	(1111 1101)	10001	1110	AP<
8.	+ 0000 0100			
	0000 0001			$A-M \rightarrow$ неуспешно

$$P = 30$$

$$A = -3$$

ISOMAT S.A.

HEAVY INDUSTRIES THE EASY WAY OF LIFE

$$\Gamma = -126 : 3 = P = -126 = (1000 \ 0010)_2$$

$$M = \underline{B} = (0000 \ 0011)_2$$

$$-3 = (1111 \ 1101)_2$$

кодик	A	P P_0	коментар
	1111 1111	1000 0010	дометик
1.	$\begin{array}{r} 1111 1111 \\ + 0000 0011 \\ \hline 0000 0010 \end{array}$	0000 01010	$AP \leftarrow$
	1111 1111	0000 01010	$A + M \rightarrow$ неуспешно регистрација
2.	$\begin{array}{r} 1111 1110 \\ + 0000 0011 \\ \hline 0000 0001 \end{array}$	0000 10100	$AP \leftarrow$
	1111 1110	0000 10100	$A + M \rightarrow -11-$
3.	$\begin{array}{r} 1111 1100 \\ + 0000 0011 \\ \hline 0001 01011 \end{array}$	0001 01000	$AP \leftarrow$
	1111 1100	0001 01000	$A + M \rightarrow A, 1 \rightarrow P_0$
4.	$\begin{array}{r} 1111 1100 \\ + 0000 0011 \\ \hline 0000 0001 \end{array}$	00101, 0010	$AP \leftarrow$
	1111 1100	00101, 0010	$A + M \rightarrow$ неуспешно регистрација
5.	$\begin{array}{r} 1111 1100 \\ + 0000 0011 \\ \hline 0001 01011 \end{array}$	01010 01000	$AP \leftarrow$
	1111 1100	01010 01000	$A + M \rightarrow A, 1 \rightarrow P_0$
6.	$\begin{array}{r} 1111 1100 \\ + 0000 0011 \\ \hline 0000 0001 \end{array}$	10100 1010	$AP \leftarrow$
	1111 1100	10100 1010	$A + M \rightarrow$ неуспешно регистрација
7.	$\begin{array}{r} 1111 1101 \\ - 0000 0011 \\ \hline 0000 0000 \end{array}$	01001 01000	$AP \leftarrow$
	1111 1101	01001 01000	$A + M \rightarrow A, AP_1 = 0, 1 \rightarrow P_0$
8.	$\begin{array}{r} 1111 1101 \\ - 1111 1101 \\ \hline 0000 0000 \end{array}$	10010 1010	$AP \leftarrow$
	1111 1101	10010 1010	$A + M \rightarrow$ неуспешно регистрација

Комитар: $P = -(0010 \ 1010) = -42$

Основатар: $A = 0$

11 - 154:17

$$P = -154 = (1 \ 0110 \ 0110)_2^3$$

$$M = 17 = (0 \ 0001 \ 0001)_2^3$$

кодик	A	P	P_3	коментар
	1 1111 1111	1 0110 0110		0 и етак
1.	1 1111 1111 + 0 0001 0001	0 1100 1100	AP ←	$A + M \rightarrow$ Неслажено результат
	0 0001 0000	0 1100 11010		
	1 1111 1111	1 1001 10100	AP ←	
2.	0 0001 0001 + 0 0001 0001	0 0000 1111		$A + M \rightarrow -11-$
	0 0000 1111	1 1001 10100	-11-	

3, - 5:	A	P	P_3	коментар
	1 1110 1100	1 10100 0000	AP ← (4x)	
6.	+ 0 0001 0001	1 1101 0000		$A + M \rightarrow A, 1 \rightarrow P_3$
	1 1111 1101	1 10100 0000		
	1 1111 1011	1 01000 0010	AP ←	
7.	+ 0 0001 0001	0 0000 1100		$A + M \rightarrow$ Неслажено
	0 0000 1100	1 01000 0010		
	1 1111 1011	1 01000 0010		результат
	1 1111 0111	0 10000 0100	AP ←	
8.	+ 0 0001 0001	0 0000 1000		$A + M \rightarrow -11-$
	0 0000 1000	1 01000 0100	-11-	
	1 1111 0111	0 10000 0100		
	1 1111 0111	0 0000 1000	AP ←	
9.	+ 0 0001 0001	1 1111 1111		$A + M \rightarrow A, 1 \rightarrow P_3$
	1 1111 1111	0 0000 1000		

Коммінук: $P = (0 \ 0000 \ 1000)_2^3 = -9$

Остаток: $A = (1 \ 1111 \ 1111)_2^3 = -1$

$$f) -A\Omega : (-\Delta A) = P = (1001 1010)_2^{\delta} \quad M = 2A = (0001 0101)_2^{\delta}$$

$$-\Delta A = (1110 1011)_2^{\delta}$$

кодик	A	P	коштнор
1.	$\begin{array}{r} 1111 1111 \\ + 0001 0101 \\ \hline 0010 0100 \end{array}$	$\begin{array}{r} 1001 1010 \\ + 0011 0101 \\ \hline 0011 0100 \end{array}$	пчесник
2.	$\begin{array}{r} 1111 1110 \\ + 0001 0101 \\ \hline 0001 0011 \\ 1111 1110 \end{array}$	$\begin{array}{r} 0110 10100 \\ + 0110 10100 \\ \hline 0110 10100 \end{array}$	$A - M \rightarrow$ неудачна результатуја
3.	$\begin{array}{r} 1111 1100 \\ + 10001 0101 \\ \hline 0001 0001 \\ 1111 1100 \end{array}$	$\begin{array}{r} 1101 01000 \\ + 1101 01000 \\ \hline 1101 01000 \end{array}$	$A - P \leftarrow$
4.	$\begin{array}{r} 1111 1001 \\ + 0001 0101 \\ \hline 0000 1110 \\ 1111 1001 \end{array}$	$\begin{array}{r} 1010 0000 \\ + 1010 0000 \\ \hline 1010 0000 \end{array}$	$A - M \rightarrow -11-$
5.	$\begin{array}{r} 1111 0011 \\ + 0001 0101 \\ \hline 0000 1100 \\ 1111 0011 \end{array}$	$\begin{array}{r} 01010 0000 \\ + 01010 0000 \\ \hline 01010 0000 \end{array}$	$A - P \leftarrow$
6.	$\begin{array}{r} 1110 0110 \\ + 0001 0101 \\ \hline 1111 1011 \end{array}$	$\begin{array}{r} 10100 0000 \\ + 10100 0000 \\ \hline 10100 0000 \end{array}$	$A - M \rightarrow -11-$
7.	$\begin{array}{r} 1111 0111 \\ + 0001 0101 \\ \hline 0000 1100 \\ 1111 0111 \end{array}$	$\begin{array}{r} 10100 0000 \\ + 10100 0000 \\ \hline 10100 0000 \end{array}$	$A - M \rightarrow A, 1 - P$
8.	$\begin{array}{r} 1110 1110 \\ + 0001 0101 \\ \hline 0000 0011 \\ 1110 1110 \end{array}$	$\begin{array}{r} 01000 0010 \\ + 01000 0010 \\ \hline 01000 0010 \end{array}$	$A - M \rightarrow$ неудачна результатуја
		$\begin{array}{r} 10000 0100 \\ + 10000 0100 \\ \hline 10000 0100 \end{array}$	$A - P \leftarrow$
		$\begin{array}{r} 00000 0100 \\ + 00000 0100 \\ \hline 00000 0100 \end{array}$	$A - M \rightarrow -11-$

Компакт: $P = (0000 0100)_2^{\delta} = 4$

Остаток: $A : (1110 1110)_2^{\delta} = \underline{-32 + 8 + 4 + 2 = -18}$

(11) Јрејуб лог

A) $A = (100110)_2$

$$\sqrt{g_{n-1}} = a_{n-1}$$

$$A: \begin{matrix} 1 & 0 & 0 & 1 & 1 & 0 \\ \downarrow & \searrow & \downarrow & \rightarrow & \searrow & \downarrow \end{matrix}$$

$$g_i = a_i \oplus a_{i+1}, i=1-2, \dots, 0$$

$$G: \begin{matrix} 1 & 1 & 0 & 1 & 0 & 1 \end{matrix}$$

$$G = (110101)_2$$

B) $A = (010110)_2$

$$\sqrt{g_{n-1}} = a_{n-1}$$

$$A: \begin{matrix} 0 & 1 & 0 & 1 & 1 & 0 \\ \downarrow & & & & & \end{matrix}$$

$$g_i = a_i \oplus a_{i+1}$$

$$G = (011101)_2$$

B) $A = (23)_{10} = (101111)_2$

$$\sqrt{g_{n-1}} = a_{n-1}$$

$$A: \begin{matrix} 1 & 0 & 1 & 1 & 1 & 1 \end{matrix}$$

$$g_i = a_i \oplus a_{i+1}$$

$$G: \begin{matrix} 1 & 1 & 1 & 0 & 0 \end{matrix}$$

$$G = (11100)_2$$

C) $A = (56)_7 = (41)_{10} = (1010001)_2$

$$A: \begin{matrix} 1 & 0 & 1 & 0 & 0 & 1 \end{matrix}$$

$$\sqrt{g_{n-1}} = a_{n-1}$$

$$G: \begin{matrix} 1 & 1 & 1 & 1 & 0 & 1 \end{matrix}$$

$$g_i = a_i \oplus a_{i+1}$$

$$G = (111101)_2$$

f) 2. A) $G = (011010)_2$ $a_{n-1} = g_{n-1}$
 $G: 0 \ 1 \ \wedge \ \wedge \ 0 \ 1 \ 0$ $a_i = g_i \oplus a_{i+1}$
 $A: 0 \ 1 \ 0 \ 0 \ 1 \ \wedge$
 $A = (01001\wedge) = \underline{19}$

6) $G = (1101110)_2$ $a_{n-1} = g_{n-1}$
 $G: 1 \ 1 \ 0 \ \wedge \ 1 \ \wedge \ 0$ $a_i = g_i \oplus a_{i+1}$
 $A: 1 \ 0 \ 0 \ 1 \ 0 \ 0$
 $A = (100100)_2 = \underline{36}$

(12) Binary 32

[1] A) $-111.625 = -(1101111.101)_2 = -(1.101111101)_2 \cdot 2^6$

Exp: $6 + 127 = 128 + 5 = (1000 0101)_2$

Summe: 1 0000 0101 1011111010...0
 unterstrichen: 23

B) $-71.75 \cdot 2^{-13} = -(1000111.11)_2 \cdot 2^{-13} = -(1.00011111)_2 \cdot 2^{-7}$

Exp: $-7 + 127 = (0111 1000)_2$

Summe: 1 0111 1000 00011110...0
 unterstrichen: 23

B) $19.125 \cdot 2^7 = (10011.001)_2 \cdot 2^7 = (1.0011001)_2 \cdot 2^{11}$

Exp: $11 + 127 = (1000 1010)_2$

Summe: 0 1000 1010 00110010...0
 unterstrichen: 23

$$\Gamma) -124 = -(0111 \wedge 1100)_2 = -(1.111100)_2 \cdot 2^6$$

$$\text{exp: } 6+127 = (1000 \quad 0101)_2$$

Задача: 1 1000 0101 $\underbrace{11110\dots 0}_{23}$

$$11) 0.375 = (0.011)_2 = (1.1)_2 \cdot 2^{-2}$$

$$\text{exp: } -2+127 = (0111 \quad 1101)_2$$

Задача: 0 0111 1101 $\underbrace{10\dots 0}_{23}$

$$5) 68.125 = (1000.0100.001)_2 = (1.000100001)_2 \cdot 2^6$$

$$\text{exp: } 6+127 = (1000 \quad 0101)_2$$

Задача: 0 1000 0101 $\underbrace{0001000010\dots 0}_{23}$

$$e) -79.5 = -(10011111.1)_2 = -(1.00111111)_2 \cdot 2^6$$

$$\text{exp: } 6+127 = (1000 \quad 0101)_2$$

Задача: 1 1000 0101 $\underbrace{00111110\dots 0}_{23}$

$$2) A) 1|1000011010010\dots 0$$

Задача: -

$$\text{exp: } (1000 \quad 0110)_2 - 127 = 134 - 127 = 7$$

Фракција: $(1.1001)_2$

$$-(1.1001)_2 \cdot 2^7 = -(110010000)_2 = \underline{\underline{-200}}$$

6) 11000110010101010.. 0

Знак: -

$$\text{exp: } (1000001101)_2 - 127 = \frac{1}{4}$$

дробијуја: $(1.0001001101)_2$

$$- (1.0001001101)_2 \cdot 2^7 =$$

$$= - (10001001, 10101)_2 = -137, 65625$$

B) 0001101111001010.. 0

Знак: +

$$\text{exp: } (00110111)_2 - 127 = -72$$

дробија: $(1.100101)_2$

$$(1.100101)_2 \cdot 2^{-72} = (1100101)_2 \cdot 2^{-78} = 101 \cdot \underline{\underline{2}}$$

G) 010001111010010.. 0

Знак: +

$$\text{exp: } (10000111)_2 - 127 = 8$$

дробија: $(1.01001)_2$

$$(1.01001)_2 \cdot 2^8 = (101001)_2 \cdot 2^3 = 41 \cdot \underline{\underline{2^3}}$$

且) $1|10010001011010\dots$

ЗНАК: —

$$\exp: (1001\ 0001)_2 - 127 = 18$$

фракция: $(1.01101)_2$

$$-(1.01101)_2 \cdot 2^{18} = -(1011101)_2 \cdot 2^{13} = -45_{10} \cdot 2^{13}$$

3

A) 1111111111110001000100010... C

$\Rightarrow \text{NaN}$

5) 100000000 | 0000000000000000

⇒ ~~однотриманчі проj~~

ЗНАК: —

exp: -126

Фракция: (0.00000010001),

$$-(0.00000010001)_2 \cdot 2^{-126} = -(100001)_2 \cdot 2^{-137} = -17 \cdot 2^{-137}$$

B) ପରିପାତା ପରିପାତା | ପରିପାତା

$\Rightarrow +0$

r) 1|1111111111|10010010010010...

\Rightarrow gNaN

1) 00000000011010...

⇒ суперкомпьютеры

3 tax: +

Exp: - 126

діракури: $(0.1101)_2$

$$(0.1101)_2 \cdot 2^{-126} = (1101)_2 \cdot 2^{-130} = 13 \cdot 2^{-130}$$

$$5) \quad \text{Algebraic expression: } (1101)_2$$

\Rightarrow $\sin \alpha$

e) $\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{NH}_2$

→ - 8

13) Binary B4

A) $48.125 = (110000.001)_2 = (1.10000\ 001)_2 \cdot 2^5$

exp: $5 + 1023 = (1\ 00000\ 00100)_2$

Задание: 0 10000000100 100000010...0
52

B) $-1780.53125 = -(11011110100.10001)_2 :$

$$= -(1.101111010010001)_2 \cdot 2^{10}$$

exp: $10 + 1023 = (1\ 00000\ 01001)_2$

Задание: 1 10000001001 101111010010010...0
52

B) $-0.4375 = -(0.0111)_2 = -(1.11)_2 \cdot 2^{-2}$

exp: $-2 + 1023 = (0\ 11111\ 11101)_2$

Задание: 1 01111111101 110...0
52

C) $-190.625 = -(11000111.101)_2 :$

$$= -(1.1000111101)_2 \cdot 2^7$$

exp: $7 + 1023 = (1\ 00000\ 00110)_2$

Задание: 1 10000000110 10001111010...0
52

1) $-201 \cdot 375 = -(11001001,011)_2 =$
 $= -(1,1001001011)_2 \cdot 2^7$

exp: $7 + 1023 = (10000000111)_2$

знач: $110000000111 \underbrace{1001001011\dots}_2$

2) A) $110000001100110110\dots_2$

знач: -

exp: $(1000000110011)_2 - 1023 = 26$

дробија: $(1,1011)_2$

$-(1,1011)_2 \cdot 2^{26} = -(11011)_2 \cdot 2^{22} = -27 \cdot 2^{22}$

6) $1000011000101000110\dots_2$

знач: -

exp: $(00001100010)_2 - 1023 = -925$

дробија: $(1,100011)_2$

$-(1,100011)_2 \cdot 2^{-925} = -(1100011)_2 \cdot 2^{-931} =$
 $= -\underline{\underline{99}} \cdot 2^{-931}$

B) $01110000100100001010\dots_2$

знач: +

exp: $(110000010000)_2 - 1023 = 777$

дробија: $(1,00000101)_2$

$(1,00000101)_2 \cdot 2^{777} = (100000101)_2 \cdot 2^{770} =$
 $= \underline{\underline{133}} \cdot 2^{770}$

(14) decimal 32 (DPS)

A) $8.175 = 8175 \cdot 10^{-3} = (0008175 \cdot 10^{-3})$

$d_1 = (000)_2$

exp: $-3 + 101 = (01100010)_2$

квад: 011000100010

остаток: 0 0 8 1 7 3
000 0001000 0011110 011

знач: 0 01000100010 0000001000001111000

5) $-246.8957 = -2468957 \cdot 10^{-4}$

знак: -

$d_1 = (010)_2$

exp: $-4 + 101 = (01100001)_2$

квад: 01100001100001

остаток: 4 6 8 9 5 7
100 1101000 1111011101

знач: 1 01010100001 1001101001111011

$$B) 0.9173598 = (9173598 \cdot 10^{-7})$$

знак: +

$$d_1 = 9 = (1001)_2$$

$$\text{exp: } -7 + 101 = (0\cancel{1}01 1110)_2$$

код: 11011011110,

$$\begin{array}{ccccccccc} \text{остаток:} & 1 & 7 & 3 & 5 & 9 & 8 \\ & 001 & 111 & 0 & 001 & 101 & 101 & 110 \end{array}$$

запись: 0 11011011110 0011110011101110

$$Г) 864.5193\underline{8}22 = (8645194 \cdot 10^{-4})$$

знак: +

$$d_1 = (1000)_2$$

$$\text{exp: } -4 + 101 = (\underline{0}1\cancel{1}0 0001)_2$$

код: 110110100001,

$$\begin{array}{ccccccccc} \text{остаток:} & 6 & 4 & 5 & 1 & 9 & 4 \\ & 110 & 100 & 0 & 101 & 001 & 101 & 1010 \end{array}$$

запись: 0 11010100001 1101000101 0011011010

$$Д) -53.28 \cdot 10^{23} = -5328 \cdot 10^{20} = -0005328 \cdot 10^{20}$$

знак: -

$$d_1 = (000)_2$$

$$\text{exp: } 20 + 101 = (\underline{0}1\cancel{1}1 1001)_2$$

код: 0111001, 1111001,

$$\begin{array}{ccccccccc} \text{остаток:} & 0 & 0 & 5 & 3 & 2 & 8 \\ & 000 & 000 & 0 & 101 & 011 & 0101 & 000 \end{array}$$

запись: 1 01000111001 000000101 0110101000

$$f) 94 \cdot 58 \cdot 10^7 = 9458 \cdot 10^5 = 9458 \cdot 10^5$$

Знак:

$$d_1 = (000)_2$$

$$\text{exp: } 5 + 101 = (0110, 1010)_2$$

$$\text{kond: } \underline{101}, \underline{1000}, \underline{11010101},$$

$$\begin{array}{r} \text{ОСТАТК: } 0 \quad 0 \quad 9 \quad 4 \quad 5 \quad 8 \\ 000 \quad 000 \quad 1 \quad 001 \quad - \quad 100 \quad 101 \quad 1 \quad 000 \end{array}$$

$$\text{ЗАИН: } 0 \quad 010000101010 \quad 00000001001 \quad 1001011000$$

$$e) -4 \cdot 5781 \cdot 10^{11} = -45781 \cdot 10^7 = -45781 \cdot 10^7$$

Знак: -

$$d_1 = (000)_2$$

$$\text{exp: } 7 + 101 = (01110 \quad 1100)_2$$

$$\text{kond: } \underline{101}, \underline{1000}, \underline{1101100},$$

$$\begin{array}{r} \text{ОСТАТК: } 0 \quad 4 \quad 5 \quad 7 \quad 8 \quad 1 \\ 000 \quad 100 \quad 0 \quad 101 \quad 111 \quad 000 \quad 1 \quad 011 \end{array}$$

$$\text{ЗАИН: } 1 \quad 01000101010 \quad 0001000101 \quad 1110010111$$

B 2 (двоичноради)

A) $0|10000110010|1110001110 \underbrace{00\dots}_\infty$

Знак: +

квад: $(10|000,110010)_2$

$d_1 = (000)_2 = 0$

exp: $(10110010)_2 - 101 = 77$

остаток:

$$\begin{array}{r} 111000 \\ 10011000 \\ \hline 9 \quad 8 \end{array} \begin{array}{r} 110 \\ 010 \\ \hline 6 \end{array} \begin{array}{r} 000 \\ 000 \\ \hline 0 \quad 0 \end{array} \begin{array}{r} 000 \\ 000 \\ \hline 0 \end{array}$$

$$= +986000 \cdot 10^{77} = +9.86 \cdot 10^{86}$$

5) $111011100000|00111111000|1101010111$

Знак: -

квад: $(111011100000)_2$

$d_1 = (1001)_2 = 9$

exp: $(01100000)_2 - 101 = -5$

остаток:

$$\begin{array}{r} 001111 \\ 00010111 \\ \hline 1 \quad 7 \end{array} \begin{array}{r} 1000 \\ 1000 \\ \hline 8 \end{array} \begin{array}{r} 110 \\ 101 \\ \hline 6 \quad 5 \end{array} \begin{array}{r} 0 \quad 111 \\ 111 \\ \hline 7 \end{array}$$

$$= -9178657 \cdot 10^{-5} = -91.78657$$

3) $1|00101101001100010100111110011100$

Знак: -

квад: $(0010110011)_2$

$d_1 = (101)_2 = 5$

exp: $(001010001)_2 - 101 = -60$

остаток:

$$\begin{array}{r} 10010100 \\ 4 \quad 5 \quad 0 \quad 011 \\ \hline 3 \end{array} \begin{array}{r} 111001100 \\ 1091 \quad 1 \quad 100 \\ \hline 8 \end{array}$$

$$= -5453916 \cdot 10^{-60} = -5.453916 \cdot 10^{-54}$$

I) 01110001100001001000001011

bitar: +

komj: $(\underline{10100}011000)_2$

$$d_1 = (1000)_2 = 8$$

$$\text{exp: } (1001 \ 1000)_2 \cdot 101 = 51$$

outarar:

001	001	1	110	110	111	1	011
1001	1001		0000	0110	1001	0011	
9	9	0		6	9	7	

$$= 8990697 \cdot 10^{51} = \underline{\underline{8,990697 \cdot 10^{51}}}$$

II) 1110000110110... 0

bitar: -

komj: $(\underline{11000}011011)_2$

$$d_1 = (1000)_2 = 8$$

$$\text{exp: } (0001 \ 1011)_2 \cdot 101 = -74$$

$$= 80000000 \cdot 10^{-74} = \underline{\underline{8 \cdot 10^{-68}}}$$

3 A) A11110110000|1100111110000001101

$$\pi > -8$$

5) 1 11111111 10100000001000101110101001

=> sNaN

8) 01111100110111010111110101111101

$\Rightarrow qNaN$

$\Rightarrow + \circ$

(15) decimal 32 (BiD)

A) $-14.37 = -1437 \cdot 10^{-2}$

Знак: -

exp: $-2+101 = (0110\ 0011)_2$

$1437 = (10110011101)_2^{11} = (000000000010110011101)_2^{23}$

код: 10110011101

餘数: 101100011000 00... 010110011101
g

b) $982.5294 \cdot 10^{42} = 9825294 \cdot 10^{38}$

Знак: +

exp: $38+101 = (1000\ 1011)_2$

$9825294 = (1000101101110110011000001101)_2^{24}$

код: 1000101111

餘数: 011100010111 01011100100... 01110

20

$$B) 1089852 = 1089852 \cdot 10^{-1} \rightarrow$$

Знак: +

$$\text{exp: } -14101 = (011001000)_2$$

$$1089852 = (100001010000100111100)_2^{14}$$

$$= (\underline{\underline{00100001010000100111100}})_2^{23}$$

канд: 01100100001,

Задача: 0 01100100001 000010100000100111100
A) 1011000110000100...001011

Знак: -

$$\text{канд: } (\underline{\underline{0110001100001}})_2$$

$$\text{exp: } (011001000)_2 - 101 = 1$$

$$\text{фракция: } (\underline{\underline{0000\ldots 001001}})_2^{19}$$

$$= -11 \cdot 10 = \underline{-110}$$

5) 0|1101011111111|00100...01
20

Знак: +

$$\text{канд: } (\underline{\underline{1101011111111}})_2$$

$$\text{exp: } (010111111)_2 - 101 = -6$$

$$\text{фракция: } (\underline{\underline{100100100\ldots 01}})_2^{23}$$

$$= 9568257 \cdot 10^{-6} = \underline{\underline{9.568257}}$$

16 Сдирате и създавате в Binary32

1 $36.3125 + (-214.25)$

$$\begin{aligned} 36.3125 &= (100100.0101)_2 = \\ &= (1.0010000101)_2 \cdot 2^5 = (0.01001000101)_2 \cdot 2^7 \end{aligned}$$

$$\text{exp: } 5 + 127 = (1000 0100)_2$$

23

знач: 0 10000100 0010000100...0

$$\begin{aligned} -214.25 &= -(110010000.01)_2 = \\ &= -(1.10010000)_2 \cdot 2^7 \end{aligned}$$

$$\text{exp: } 7 + 127 = (1000 0110)_2$$

23

знач: 1 10000100 101001100010...0

знак: -

$$\text{exp: } 7 + 127 = (1000 0110)_2$$

$$\begin{array}{r} \text{действие: } 1.10010000 \\ - 0.01001000101 \\ \hline 1.01100011111 \end{array}$$

23

знач: 1 10000110 011000111110...0

$$\begin{aligned} -(1.01100011111)_2 \cdot 2^7 &= -(10110001.1111)_2 = \\ &= -177.8375 \end{aligned}$$

12

a) $1\overline{1}000011011101010\dots_2 + 1\overline{1}00001011011110010\dots_2$

Знак: -

$$\text{exp: } (1000 \ 0110)_2$$

Фракция: $1.10011011101110\dots_2$

$$\begin{array}{r} 1.10011011101110 \\ + 0.11011011101110 \\ \hline 10.10011011101110 \end{array}$$

$$= (1.01001101110)_2 \cdot 2^1$$

$$\Rightarrow \text{exp: } (1000 \ 0110)_2 + 1 = (1000 \ 0111)_2 - 127 = 4$$

Задача: 1 1000 0111 $\underbrace{010011011101010\dots_2}_{23}$

$$- (1.01001101110)_2 \cdot 2^8 = -(101001101110)_2 = -333,75$$

b) $0\overline{1}00000101100110\dots_2 + 0\overline{1}0000001011010\dots_2$

Знак: +

$$\text{exp: } (1000 \ 0010)_2$$

Фракция: 1.100110

$$\begin{array}{r} 1.100110 \\ + 0.110110 \\ \hline 10.011110 \end{array}$$

$$= (1.001110)_2 \cdot 2^1$$

$$\Rightarrow \text{exp: } (1000 \ 0010)_2 + 1 = (1000 \ 0011)_2 - 127 = 4$$

Задача: 0 1000 0011 $\underbrace{001110\dots_2}_{23}$

$$(1.00111)_2 \cdot 2^4 = (1.00111.1)_2 \cdot \underline{19.5}$$

b) $1\overline{1}000001101101010\dots_2 + 0\overline{1}00001001101010\dots_2$

Знак: +

$$\text{exp: } (1000 \ 0100)_2$$

Фракция: 1.110110110

$$\begin{array}{r} 1.110110110 \\ - 0.110110110 \\ \hline 0.111110110 \end{array}$$

$$= (1.1111011)_2 \cdot 2^{-1}$$

$$\Rightarrow \text{exp: } (1000 \ 0100)_2 - 1 = (1000 \ 0011)_2 - 127 = 4$$

Задача: 0 1000 0011 $\underbrace{11110110\dots_2}_{23}$

$$(1.1111011)_2 \cdot 2^4 = (11111.011)_2 = \underline{31.375}$$

$$\Gamma) 101110100110010\dots 0 + 101110100110110\dots 0$$

Знак: -

$$\text{exp: } (0111 \ 0100)_2$$

$$\begin{array}{r} \text{Фракция: } \\ 1.110010 \\ + 1.010111 \end{array}$$

$$\underline{11.001001} = (1.1001001)_2 \cdot 2^4$$

$$\Rightarrow \text{exp: } (0111 \ 0100)_2 + 1 = (0111 \ 0101)_2 - 127 = -10$$

Знак: 1 0111 0101 10010010... 0

$$-(1.1001001)_2 \cdot 2^{-10} = -(1.1001001)_2 \cdot 2^{-17} = -201 \cdot 2^{-17}$$

$$\Pi) 0100001101010110\dots 0 - 01000001001110\dots 0$$

Знак: 0

$$\text{exp: } (1000 \ 0110)_2 - 127 = 7$$

$$\begin{array}{r} \text{Фракция: } \\ 1.10101100 \\ - 0.000101111 \\ \hline 1.10010101 \end{array}$$

Знак: 0 10000110 100101010... 0

$$(10010101)_2 \cdot 2^7 = (11001010.1)_2 = \underline{\underline{202.5}}$$

17. Множение в binary 32

1) $\lim_{n \rightarrow \infty} a_n = 0$ • $\lim_{n \rightarrow \infty} b_n = 0$

Знак: -

$$\begin{array}{r}
 \text{exp:} \quad 101111000 \\
 + 101111100 \\
 \hline
 1011110100 \\
 - 001111111 \\
 \hline
 11110101
 \end{array}$$

$$(1111 \quad 0101)_2 \cdot 1111 = 1110$$

$$\text{Фракција: } \frac{1.10101 \cdot 1.001}{110101} \\ \underline{110101} \\ 11010100 \\ \underline{111011101}$$

Задача: А ПРИДАЮТ МНОГОМОДУЛЬНОЕ

$$-(1.11011101)_2 \cdot 2^{118} = -(1111011101)_2 \cdot 2^{110} = \\ = -477 \cdot 2^{110}$$

5) $0.\overline{100000110010\ldots} = 0.\overline{100000110010\ldots}$

Black: +

$$\begin{array}{r}
 \text{exp: } 100000011 \\
 + 100000001 \\
 \hline
 1000000100 \\
 - 0011111111 \\
 \hline
 010000101
 \end{array}$$

$$(1000 \ 0101)_2 - 127 = 6$$

$$\text{Фракция: } \frac{1.11 \cdot 1.001}{111}$$

3rd Inc: 0 10000101 111110..0

$$(1 \cdot 111111)_2 \cdot 2^6 = (11111110)_2 = 126$$

3 max: -

$$\begin{array}{r}
 \text{exp:} \quad \begin{array}{l} \text{V} \\ \text{U} \\ \text{O} \\ \text{O} \\ \text{C} \\ \text{C} \\ \text{C} \\ \text{C} \\ \text{A} \end{array} \\
 + \begin{array}{l} \text{V} \\ \text{U} \\ \text{O} \\ \text{O} \\ \text{D} \\ \text{D} \\ \text{D} \\ \text{D} \\ \text{A} \end{array} \\
 \hline
 \begin{array}{l} \text{1} \\ \text{0} \\ \text{0} \\ \text{0} \\ \text{0} \\ \text{0} \\ \text{1} \\ \text{0} \\ \text{0} \end{array} \\
 - \begin{array}{l} \text{0} \\ \text{0} \\ \text{1} \end{array} \\
 \hline
 \begin{array}{l} \text{1} \\ \text{0} \\ \text{0} \\ \text{0} \\ \text{0} \\ \text{1} \\ \text{0} \\ \text{0} \\ \text{1} \end{array}
 \end{array}$$

$$(1000 \ 1001)_2 - 127 = 10$$

$$1.0011110111 \stackrel{\text{max.}}{=} (1.0011110111)_2 \cdot 2^1$$

$$\Rightarrow \text{exp} : (10001001)_2 + 1 = (1000\ 1010)_2 \quad (-1N)$$

Задача: А 10001010 00011110110...0

$$-(1.0001110111)_2 \cdot 2^{11} = -(100011110111)_2 = -2295$$

r) $\overline{1100001100010110\dots} \cdot \overline{010000010110\dots}$

Знак: -

$$\begin{array}{r} \text{exp: } 10000011 \\ + 10000001 \\ \hline 100000100 \\ - 001111111 \\ \hline 100000101 \end{array}$$

$$(1000101)_2 \cdot 127 = 6$$

$$\begin{array}{r} \text{сфракнуда: } \frac{1.0001011 \cdot 1.011}{10001011} \\ 10001011 \\ 100010110 \\ \hline 1.0111111001 \end{array}$$

Задача: $\overline{110000101} \quad 0111111001\dots$

$$\begin{aligned} - (1.0111111001)_2 \cdot 2^6 &= -(1011111.1001)_2 \\ &= - \underline{\underline{95.6625}} \end{aligned}$$

18) Денесе ж бінагы 32

A) 01000001001110110...0 / 110000011010...0

ЗНАК: -

$$\begin{array}{r} \text{exp: } 10000100 \\ - 100000001 \\ \hline 00000011 \\ + 01111111 \\ \hline 10000010 \end{array}$$

$$(10000010)_2 - 127 = 3$$

дөрөзүндүгө: 1.1110111; 1.101:

$$\begin{array}{r} = 1111.0111; 1101 = 1.0011 \\ - 1101 \downarrow \downarrow \downarrow \\ \hline 0010011 \\ 1101 \\ \hline 01101 \\ \hline 1101 \end{array}$$

ЗАБІЛСІ: 1 10000010 00110...0

$$-(1.0011)_2 \cdot 2^3: -(1001 \cdot 1)_2 = -\underline{\underline{9.5}}$$

$$6) \frac{11010011010\ldots_2}{10101011010\ldots_2}$$

Знак: 0

$$\begin{array}{r} \text{exp: } 100100110 \\ - 00100110 \\ \hline 01100110 \\ + 0111111 \\ \hline 11101011 \end{array}$$

$$(11101011)_2 = 127 = 108$$

$$\text{дробь: } 1.011111 : 1.01 = 101 \cdot 1111 ; 101 = 1.00_{10}$$

$$\begin{array}{r} 101 \downarrow \downarrow \\ \hline 111 \\ 101 \downarrow \\ \hline 0101 \\ 101 \end{array}$$

запись: 0 11101011 0011110...

$$(1.0011)_2 \cdot 2^{108} = (10011)_2 \cdot 2^{104} = 19 \cdot 2^{104}$$

$$3) \frac{01101001101000010010\ldots_2}{11010011010\ldots_2}$$

Знак: -

$$\begin{array}{r} \text{exp: } 11010011 \\ - 10101111 \\ \hline 00100100 \\ + 01111111 \\ \hline 10100011 \end{array}$$

$$\text{дробь: } 1.00001001 : 1.01 = 100 \cdot 001001 : 101 = 0.110101$$

$$\begin{array}{r} 100 \downarrow \\ - 101 \downarrow \\ \hline 00110 \downarrow \\ 101 \downarrow \\ \hline 00110 \end{array} = (1.10101)_2 \cdot 2^3$$

exp: (1010001)

запись: 1 10100010 1010010...

$$\begin{array}{r} 101 \\ \hline 00101 \\ 101 \end{array}$$

$$-(1.10101)_2 \cdot 2^{35} = -(110101)_2 \cdot 2^{30} = -53 \cdot 2^{30}$$

Г) 000000010101010...0 / 000000000110...0
ответ: 0

344 : 0

$$\begin{array}{r}
 \text{exp:} \quad 00000001 \\
 - 000000000 \\
 \hline
 00000001 \\
 + 01111110 \\
 \hline
 01111111
 \end{array}$$

գրույնից: $1 \cdot 0101$; $0 \cdot 11 = 101 \cdot 01$; $11 = 1 \cdot 11$

$$\begin{array}{r} 111 \\ \times 100 \\ \hline 11100 \end{array}$$

Задача: О СТАВЛЯЮЩИХСЯ В МОНОГРАФИИ

$$(1.11)_2 \cdot 2^0 = 1.11$$

19) Бројната систем са останаки

A) $x = 83$, RBS(51312)

$$83 \bmod 5 = 3$$

$$M = 5 \cdot 3 \cdot 2 = 30$$

$$83 \bmod 3 = 2$$

$$83 \bmod 2 = 1$$

$$x = 83 = (3|2|1)_{RBS(51312)} = 23$$

$$83 \bmod 30 = 23$$

B) $x = 46$, RBS(615)

$$46 \bmod 6 = 4$$

$$M = 6 \cdot 5 = 30$$

$$46 \bmod 5 = 1$$

$$x = 46 = (4|1)_{RBS(615)} = 16$$

C) $x = 538$, RBS(91714)

$$M = 9 \cdot 7 \cdot 4 = 252$$

$$538 \bmod 252 = 34$$

$$34 \bmod 9 = 7$$

$$34 \bmod 7 = 6$$

$$34 \bmod 4 = 2$$

$$x = 538 = 34 = (7|6|1|2)_{RBS(91714)}$$

D) $x = 157$, RBS(71413)

$$M = 7 \cdot 4 \cdot 3 = 84$$

$$157 \bmod 84 = 73$$

$$73 \bmod 7 = 3$$

$$73 \bmod 4 = 1$$

$$73 \bmod 3 = 1$$

$$x = 157 = 73 = (3|1|1|1)_{RBS(71413)}$$

$$[2] \text{ A) } x = -83, \text{ RBS}(5|3|2)$$

$$83 \bmod 5 : 3$$

$$83 \bmod 3 : 2$$

$$83 \bmod 2 : 1$$

$$x = 83 = (3|2|1|1)_{\text{RBS}(5|3|2)}$$

$$x = -83 = \overline{83} = (3|2|1|1)_{\text{RBS}(5|3|2)} = (2|1|1|1)_{\text{RBS}(5|3|2)}$$

$$\text{b) } x = -46, \text{ RBS}(6|5)$$

$$46 = (4|1|1)_{\text{RBS}(6|5)}$$

$$-46 = \overline{46} = (\overline{4|1|1})_{\text{RBS}(6|5)} = (2|1|4)_{\text{RBS}(6|5)}$$

$$\text{b) } x = -538, \text{ RBS}(9|7|1|4)$$

$$538 = (7|1|6|1|2)_{\text{RBS}(9|7|1|4)}$$

$$\overline{538} = (2|1|1|2)_{\text{RBS}(9|7|1|4)}$$

$$\text{c) } x = -157, \text{ RBS}(7|1|4|1|3)$$

$$157 = (3|1|1|1|1)_{\text{RBS}(7|1|4|1|3)}$$

$$\overline{157} = (4|1|3|1|2)_{\text{RBS}(7|1|4|1|3)}$$

$$[3] \text{ A) } (3|1|2|1|2)_{\text{RBS}(7|1|5|1|3)} + (4|1|1|1|1)_{\text{RBS}(7|1|5|1|3)} =$$

$$= (7 \bmod 7 | 3 \bmod 5 | 3 \bmod 3)_{\text{RBS}(7|1|5|1|3)} =$$

$$= (0|3|1|0)_{\text{RBS}(7|1|5|1|3)}$$

$$\text{b) } (9|1|5|1|2|1|0)_{\text{RBS}(1|1|1|7|1|5|1|2)} + (4|1|6|1|3|1|1)_{\text{RBS}(1|1|1|7|1|5|1|2)} =$$

$$= (1|3 \bmod 1|1|1 \bmod 7 | 5 \bmod 5 | 1 \bmod 2)_{\text{RBS}} =$$

$$= (2|1|4|1|0|1|1)_{\text{RBS}(1|1|1|7|1|5|1|2)}$$

$$\text{b) } (3|1|2|1|2)_{\text{RBS}(7|1|5|1|3)} - (4|1|1|1|1)_{\text{RBS}(7|1|5|1|3)} =$$

$$= (7 \bmod 7 | 1 \bmod 5 | 1 \bmod 3)_{\text{RBS}(7|1|5|1|3)} =$$

$$= (6|1|1|1)_{\text{RBS}(7|1|5|1|3)}$$

$$1) (9151210)_{RBS(11171512)} - (4161311)_{RBS(11171512)}^2$$

$$= (5 \text{ mod } 11 | 1 \text{ mod } 7 | 1 \text{ mod } 5 | 1 \text{ mod } 2) =$$

$$= (5 | 6 | 4 | 1)_{RBS(11171512)}$$

$$2) (31212)_{RBS(71513)} \circ (41111)_{RBS(71513)}^2$$

$$= (12 \text{ mod } 7 | 2 \text{ mod } 5 | 2 \text{ mod } 3)_{RBS(71513)} =$$

$$= (5 | 2 | 2)_{RBS(71513)}$$

$$3) (9151210)_{RBS(11171512)} \circ (4161311)_{RBS(11171512)} =$$

$$= (36 \text{ mod } 11 | 30 \text{ mod } 7 | 6 \text{ mod } 5 | 0 \text{ mod } 2) =$$

$$= (3 | 2 | 1 | 0)_{RBS(11171512)}$$

$$4) A) (31212)_{RBS(71513)}$$

$$t_3 = (11010)_{RBS(71513)} \Rightarrow 15k \equiv 1 \pmod{7} \Rightarrow k=1 \quad \underline{\underline{t_3 = 15}}$$

$$t_2 = (01110)_{RBS(71513)} \Rightarrow 21k \equiv 1 \pmod{5} \Rightarrow k=1 \quad \underline{\underline{t_2 = 21}}$$

$$t_1 = (01011)_{RBS(71513)} \Rightarrow 35k \equiv 1 \pmod{3} \Rightarrow k=2 \quad \underline{\underline{t_1 = 70}}$$

$$(3t_3 + 2t_2 + 2t_1) \text{ mod } 7 \cdot 5 \cdot 3 = (3 \cdot 15 + 2 \cdot 21 + 2 \cdot 70) \text{ mod } 105$$

$$= 227 \text{ mod } 105 = \underline{\underline{17}}$$

$$6) (5111411)_{RBS}(11191714)$$

$$t_4 = (1101010)_{RBS}(11191714) \Rightarrow 252k \equiv 1 \pmod{91} \Rightarrow k=10 \quad t_4 = 2520$$

$$t_3 = (011010)_{RBS} \Rightarrow 308k \equiv 1 \pmod{9} \Rightarrow k=5 \quad t_3 = 1540$$

$$t_2 = (0101110)_{RBS} \Rightarrow 396k \equiv 1 \pmod{7} \Rightarrow k=2 \quad t_2 = 792$$

$$t_1 = (0101011)_{RBS} \Rightarrow 693k \equiv 1 \pmod{4} \Rightarrow k=1 \quad t_1 = 693$$

$$(5 \cdot 2520 + 1540 + 4 \cdot 792 + 693) \pmod{11 \cdot 9 \cdot 7 \cdot 4} =$$

$$= 18001 \pmod{2772} = 1369$$

$$B) 17 \cdot (-6) \quad RBS(11151312)$$

$$17 = (6121211)_{RBS}(11151312)$$

$$6' = (6111010)_{RBS}(11151312)$$

$$\bar{6} = (5141010)_{RBS}(11151312)$$

$$(6121211)_{RBS} \cdot (5141010)_{RBS} =$$

$$= (30 \pmod{11} | 8 \pmod{5} | 0 | 0)_{RBS}(11151312) =$$

$$= (8131010)_{RBS}(11151312)$$

$$t_4 = (1101010)_{RBS} \Rightarrow 30k \equiv 1 \pmod{11} \Rightarrow k=7 \quad t_4 = 210$$

$$-t_3 = (0111010)_{RBS} \Rightarrow 66k \equiv 1 \pmod{5} \Rightarrow k=1 \quad t_3 = 66$$

$$t_2 = (0101110)_{RBS} \Rightarrow 110k \equiv 1 \pmod{3} \Rightarrow k=2 \quad t_2 = 220$$

$$t_1 = (0101011)_{RBS} \Rightarrow 165k \equiv 1 \pmod{2} \Rightarrow k=1 \quad t_1 = 165$$

$$(8 \cdot 210 + 3 \cdot 66) \pmod{11 \cdot 5 \cdot 3 \cdot 2} = 1878 \pmod{330} = 228$$

$$228 - 330 = \underline{-102}$$

$$\Gamma) \quad 28 \cdot (-17), \text{RBS}(81513)$$

$$28 = (41311)_{\text{RBS}(81513)}$$

$$17 = (11212)_{\text{RBS}(81513)}$$

$$-17 = (71311)_{\text{RBS}(81513)}$$

$$(41311)_{\text{RBS}} \cdot (71311)_{\text{RBS}} = (41411)_{\text{RBS}(81513)}$$

$$t_3 = (11010)_{\text{RBS}} \Rightarrow 15k \equiv 1 \pmod{8} \Rightarrow k=4 \quad \underline{t_3 = 105}$$

$$t_2 = (01110)_{\text{RBS}} \Rightarrow 24k \equiv 1 \pmod{5} \Rightarrow k=4 \quad \underline{t_2 = 96}$$

$$t_1 = (01011)_{\text{RBS}} \Rightarrow 40k \equiv 1 \pmod{3} \Rightarrow k=1 \quad \underline{t_1 = 40}$$

$$(4 \cdot 105 + 4 \cdot 96 + 40) \pmod{8 \cdot 5 \cdot 3} = 844 \pmod{120} = 4$$

$$4 - 120 = \underline{\underline{-116}}$$

20. Откривање и корекција решака

CRC

кодирање
A)

$$G(x) = x^4 + x^3 + 1 \quad 111001110$$

$$G(x) \sim 111001 \quad n=4 \rightarrow 11100110\underline{0000},$$

$$111001100000 : 11001$$

$$\begin{array}{r} \textcircled{+} 11001 \\ \hline 0010111 \\ \textcircled{+} \underline{11001} \\ \hline 011100 \\ \textcircled{+} 11001 \\ \hline 011010 \\ \textcircled{+} 11001 \\ \hline \boxed{0001110} \end{array} \rightarrow 11100110\underline{0110},$$

$$6) G(x) = x^3 + 1 \quad 101100$$

$$G(x) \sim 1001 \quad n=3 \rightarrow 101100\underline{000},$$

$$101100000 : 1001$$

$$\begin{array}{r} \textcircled{+} 1001 \\ \hline 001000 \\ \textcircled{+} 1001 \\ \hline 000100 \\ \textcircled{+} 1001 \\ \hline \boxed{0001} \end{array} \rightarrow 101100\underline{001},$$

b) $G(x) = x^6 + x^2$ 100010111

$\tilde{G}(x) \approx 100100 \quad n: 5 \rightarrow 100010111 \underline{100000}$

1995-1988-00005 : 100100

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ОЛЮДН

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$$f(x) = x^2 + 1$$

$$G(x) \sim \Lambda \cup \Lambda \quad n=2$$

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В прокатные установки приводят и
также можно отрегулировать
расстояние между

$$\text{II) } 100111010111011 \quad G(x) = x^3 + x + 1$$

$$G(x) \approx 10^{11} \quad n=3$$

۸۰۵۸۸۸۰۱۶۱۱۱۵۸۱ = ۸۳۸۸

1011
0010111
1011
000010111
1011

ЛУЧИ **Бориса Івановича Бришнева**

Любимая фраза: ПОДЛАУЮАААА

f) 10111001011 $f(x) = x^3 + 1$

$$G(x) \sim 10001 \quad n=3$$

ԱԾԱԾՈՅՑՎՈՂԱ; ԱՅԾՎ

$$\begin{array}{r}
 1001 \\
 \underline{001000} \\
 1001 \\
 \underline{0001101} \\
 1001 \\
 \underline{0100} \\
 100
 \end{array}$$

Вопросы и ответы о школе

Анализ на опънка: 1011001

e) $\lambda\lambda00110101101$

$$G(x) = x^4 + x^2$$

$$G(x) \sim 10100 \quad n=4$$

$\lambda\lambda00110101101$: 10100

$$\begin{array}{r}
 101001 \\
 011011 \\
 \hline
 10100 \\
 011110 \\
 \hline
 10100 \\
 010101 \\
 \hline
 10100 \\
 00001010 \\
 \hline
 10100
 \end{array}$$

000101

≠ 0

Форука није усекана
Оригинална и коришћена
огр. доказана узимају форуке

SEC кодирање

2) a) 01100101
87654321

$$C_1 = 1 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$$

$$C_2 = 1 \oplus 1 \oplus 0 \oplus 1 \oplus 1 = 0$$

$$C_3 = 0 \oplus 1 \oplus 0 \oplus 0 = 1$$

↑ $C_4 = 0 \oplus 1 \oplus 1 \oplus 0 = 0$ форука: 01100101, 0100,
б) декодирање

$w_8 w_7 w_6 w_5 w_4 w_3 w_2 w_1$ $c_4 c_3 c_2 c_1$

$$C'_1 = 0 \oplus 1 \oplus 0 \oplus 0 \oplus 0 = 0$$

$$C'_2 = 0 \oplus 1 \oplus 0 \oplus 1 \oplus 0 = 0$$

⊕ 0110
0101

$$C'_3 = 1 \oplus 1 \oplus 0 \oplus 1 = 1$$

100101

$$C'_4 = 0 \oplus 1 \oplus 0 \oplus 0 \oplus 1 = 0$$

дрешка је w_1

исправљена форука:

10100111

$$B) \begin{array}{ccccccc} & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\ & | & | & | & | & | & | & | & | \\ & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}$$

$$C_1' = 1 \oplus 0 \oplus 0 \oplus 1 \oplus 1 \oplus 1 = 1$$

0000

$\oplus 0111$

$| 0111$

сумка к w₄

||

$$C_3' = 0 \oplus 1 \oplus 0 \oplus 0 = 1$$

01011001

$$C_4' = 1 \oplus 0 \oplus 1 \oplus 0 = 0$$

$$r) \begin{array}{ccccccccc} w_7 & w_6 & w_5 & w_4 & w_3 & w_2 & w_1 & C_4 & C_3 & C_2 & C_1 \\ 0 & 1 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 0 & 1 \end{array}$$

$$C_1' = 0 \oplus 1 \oplus 1 \oplus 0 \oplus 1 = 1$$

0101

$\oplus 0101$

$| 0000$

така сумка

||

$$C_3' = 1 \oplus 1 \oplus 1 \oplus 0 = 1$$

$$C_4' = 0 \oplus 1 \oplus 1 \oplus 0 = 0$$

01101110

$$D) \begin{array}{ccccccc} & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\ & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 1 \\ & | & | & | & | & | & | & | & | \\ & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 1 \end{array}$$

$$C_1' = 1 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$$

0110

$\oplus 0100$

$| 0010$

сумка к C₂

||

$$C_3' = 0 \oplus 1 \oplus 0 \oplus 1 = 1$$

$$C_4' = 0 \oplus 1 \oplus 1 \oplus 0 = 0$$

01100101

2.1 Задача са хексадекадичнии основами

1) A) $-451 \cdot 375 = -(1C3.6)_{16} = -(0.1E3600)_{16} \cdot 16^3$

Знак: -

exp: $3+64 = (100\ 0011)_2$

задача: 1 1000011 0001 1100 0011 0110 0000 0000

5) $39.5 = (27.8)_{16} = (0.278000)_{16} \cdot 16^2$

Знак: +

exp: $2+64 = (100\ 0010)_2$

задача: 0 1000010 0010 0111 1000 0... 0

B) $202.515625 = (CA.84)_{16} = (0.CA8400)_{16} \cdot 16^2$

Знак: +

exp: $2+64 = (100\ 0010)_2$

задача: 0 1000010 1100 1010 1000 0100 00... 0

Г) $-0.75 = -(0.1)_{16} = -(0.100000)_{16}$

Знак: -

exp: $(100\ 0000)_2$

задача: 1 1000000 1100 0... 0
20

Д) $-411.25 = -(19B.4)_{16} = -(0.19B400)_{16} \cdot 16^3$

Знак: -

exp: $3+64 = (100\ 0011)_2$

задача: 1 1000011 0001 1001 1011 0100 0... 0
8

21A) 110000110100...0

ЗНАЧ: -

$$\exp: (100\ 00111)_2 - 64 = 3$$

$$-(0.48)_{16} \cdot 16^5 = -(480)_{16} = \underline{\underline{-1152}}$$

Знаки -

$$\exp: (\wedge\wedge\wedge \wedge\wedge\wedge)_2 - 64 : 63$$

$$-(0.099)_{16} \cdot 16^{63} = -(0.099)_{16} \cdot 16^{60} = -3225 \cdot 16^{60}$$

3) گھریں میں اپنے بھائیوں کا سامانہ کرو۔

Знак +

exp: -64

$$(0.008)_{16} \cdot 16^{-64}, \quad (8)_{16} \cdot 16^{-67} = 8 \cdot 16^{-67}$$

r) 0100001100101100110...5

$$(0.2E38)_{16} \cdot 16^3 = (2E38)_{16} = 739.5$$

2) ମୁଖ୍ୟମନ୍ୟାନିକାରୀଙ୍କ ପାଇଁ ... ୩

$$-(0.011)_{16} \cdot 16^{-64} + -(11)_{16} \cdot 16^{-67} + -17 \cdot 16^{-67}$$