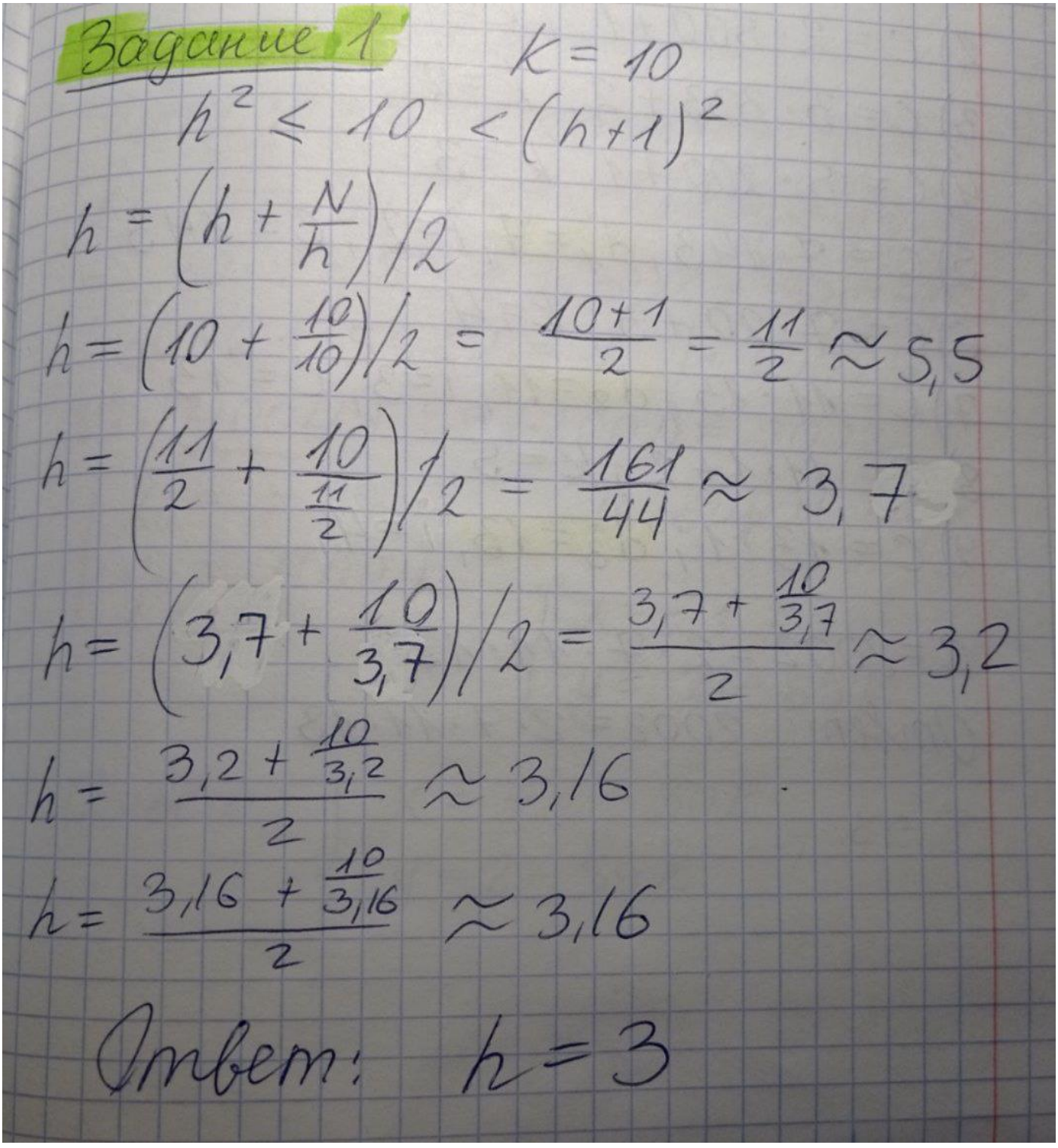
Exercise 1

k = 10, c = 2002, a = 59, b = 30



Задание 2

$C = 2002$

$C = 2002$ $\sqrt{C} \approx 44,74\ldots$

$\{2, 3, 5, 7, 11, 13 \ldots, 44\}$ – множество простых чисел

1) $C = 2 \cdot 1001$, $d_0 = 2$, $i = 1$, $C = 1001$
2) $C = 2 \cdot 500 + 1$, $k = 1$
3) $C = 3 \cdot 333 + 2$, $k = 2$
4) $C = 5 \cdot 200 + 1$, $k = 3$
5) $C = 7 \cdot 143$, $d_1 = 7$, $i = 2$, $C = 143$
6) $C = 7 \cdot 20 + 3$, $k = 4$
7) $C = 11 \cdot 13$, $d_2 = 11$, $i = 3$, $C = 13$
8) $C = 11 \cdot 1 + 2$, $k = 5$
9) $C = 13 \cdot 1$, $d_3 = 13$,

$C = 2002 = 2 \cdot 7 \cdot 11 \cdot 13$

Ответ: $2002 = 2 \cdot 7 \cdot 11 \cdot 13$

Задание 3

$a = 59,\ b = 30,\ c = 2002$

$59x + 30y = 2002$

$59 = 30 \cdot 1 + 29 \quad | \quad 29 = 59 \cdot 1 - 30 \cdot 1$

$30 = 29 \cdot 1 + 1 \quad | \quad 1 = 30 \cdot 1 - 29 \cdot 1 \ (*)$

$29 = 29 \cdot 1 + 0$

$НОД(59, 30) = 1$

$2002 \vdots 29, \quad 2002 \vdots 1$

$(*) \quad 1 = 30 \cdot 1 - 29 \cdot 1 = 30 \cdot 1 - (59 \cdot 1 - 30 \cdot 1) =$

$= 30 \cdot 1 - 59 \cdot 1 + 30 \cdot 1 = 30 \cdot 2 - 59 \cdot 1$

$30 \cdot 2 + 59 \cdot (-1) = 1 \quad | \cdot 2002$

$30 \cdot \underline{4004} + 59 \cdot \underline{(-2002)} = 2002$

$\begin{cases} x_0 = -2002 \\ y_0 = 4004 \end{cases}$

В общем виде:

$\begin{cases} x = -1 + 30k \\ y = 2 - 59k \end{cases}, \ k \in \mathbb{Z}$

Ответ: $\begin{cases} x = -1 + 30k \\ y = 2 - 59k \end{cases}, \ k \in \mathbb{Z}$

Задание 4.1.

$$3x_5 + 344_5 = 1133_5$$

I способ:

$3x_5 + 344_5 = 1133_5$

$3x_5 = 1133_5 - 344_5$

$3x_5 = 234_5 \mid :3_5$

$x = 43_5$

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

$1133_5 - 344_5 = 234_5$

$234_5 \mid 3_5$

$-22 \quad | \; 43_5$

14

-14

0

II способ:

$3x_5 + 344_5 = 1133_5$

$3_5 = 3_{10}$

$344_5 = 4 + 4 \cdot 5 + 3 \cdot 5^2 = 99_{10}$

$1133_5 = 3 + 3 \cdot 5 + 1 \cdot 5^2 + 1 \cdot 5^3 = 168_{10}$

$3x + 99 = 168$

$3x = 69 \mid :3$

$x = 23_{10}$

Ответ $x = 23_{10}$.