ДЗ 1

№1.

$h^2 \le 36225 < (h+1)^2$

$h_1 = \frac{36225 + \frac{36225}{36225}}{2} = 18113$ $\quad h_2 = \frac{18113 + \frac{36225}{18113}}{2} = 9057$

$h_3 = \frac{9057 + \frac{36225}{9057}}{2} = \frac{9057+3}{2} = 4530$ $\quad h_4 = \frac{4530 + \frac{36225}{4530}}{2} = \frac{4530+7}{2} =$

$h_5 = \frac{2268 + \frac{36225}{2268}}{2} = \frac{2268+15}{2} = 1141$ $\quad h_6 = \frac{1141 + \frac{36225}{1141}}{2} = \frac{1172}{2} = 58$

$h_7 = \frac{586 + \frac{36225}{586}}{2} = \frac{586+61}{2} = 323$ $\quad h_8 = \frac{323 + \frac{36225}{323}}{2} = \frac{323+112}{2} =$

$h_9 = \frac{217 + \frac{36225}{217}}{2} = \frac{217+166}{2} = 191$ $\quad h_{10} = \frac{191 + \frac{36225}{191}}{2} = \frac{191+189}{2} = 190$

$h = \frac{190 + \frac{36225}{190}}{2} = \frac{190+190}{2} = 190$

Ответ: $h = 190$

№2.

$c = 2001$; $\sqrt{c} \approx 44$; Перебор всех простых чисел до 44:

$2001 = 2 \cdot 1000 + 1$; $2001 = 3 \cdot 667$; $2001 = 400 \cdot 5 + 1$

$2001 = 285 \cdot 7 + 6$; $2001 = 181 \cdot 11 + 10$; $2001 = 153 \cdot 13 + 12$

$2001 = 117 \cdot 17 + 12$; $2001 = 105 \cdot 19 + 6$; $2001 = 87 \cdot 23$

$2001 = 69 \cdot 29$; $2001 = 64 \cdot 31 + 17$; $2001 = 54 \cdot 37 + 3$

$2001 = 48 \cdot 41 + 33$; $2001 = 46 \cdot 43 + 23$

Ответ:
$2001 = 3 \cdot 23 \cdot 29$

№3.

$60x + 31y = 2001$

$60 = 31 \cdot 1 + 29$

$31 = 29 \cdot 1 + 2$

$29 = 2 \cdot 14 + 1$

$2 = 1 \cdot 2$

$НОД(60; 31) = 1$

$60x_0 + 31y_0 = 1$

$x_0 = -16 \Rightarrow x_1 = \frac{-16 \cdot 2001}{1} = -32016$

$y_0 = 31 \Rightarrow y_1 = \frac{31 \cdot 2001}{1} = 62031$

Ответ: $\begin{cases} x = -32016 + 31k \\ y = 62031 - 60k \end{cases}, k \in Z$

№4.1.

$3X_5 + 344_5 = 1133_5$

1 способ (перевод в 10-ичную СС):

$3_5 = 3_{10}$ $\quad 344_5 = 4\cdot1 + 4\cdot5 + 3\cdot5^2 = 4 + 20 + 75 = 99_{10}$

$1133_5 = 3\cdot1 + 3\cdot5 + 1\cdot25 + 1\cdot125 = 168_{10}$

$3X + 99 = 168 \Rightarrow X = 23_{10}$

$23 \mid 5$
$20 \mid 4 \mid 5$
$3 \quad 0 \mid 0$
4

Ответ: 43_5

2 способ (без перевода в 10 СС):

$X = \frac{1133 - 344}{3} = \frac{234}{3} = 43_5$

$1133_5 - 344_5 = 234_5$

$234 \mid 3$
$-22 \mid 43_5$
14
14
0

№4.2.

$3_7X + 112_7 = 346_7$

1 способ (перевод в 10 СС):

$3_7 = 3_{10}$ $\quad 112_7 = 2\cdot1 + 1\cdot7 + 1\cdot49 = 58_{10}$ $\quad 346_7 = 6\cdot1 + 4\cdot7 + 3\cdot49 =$

$= 6 + 28 + 147 = 181_{10}$

$3X = 181 - 58 \Rightarrow X = 41_{10} = 7\cdot5 + 6\cdot1 = 56_7$

Ответ: 56_7

2 способ:

$3_7X = 234_7$

$X = 56_7$

$234_7 \mid 3_7$
$-21 \mid 56$
24
-24
0