Задание 1

$y = ax^2 + bx + c$

(x, y)
(1, 2)
(3, 10)
(5, 1)

Решение:

$$\begin{cases} a + b + c = 2 \\ 9a + 3b + c = 10 \\ 25a + 5b + c = 1 \end{cases}$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 9 & 3 & 1 & 10 \\ 25 & 5 & 1 & 1 \end{array}\right) = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & -6 & -8 & -8 \\ 0 & -20 & -24 & -49 \end{array}\right) =$$

$$= \left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 1 & \frac{4}{3} & \frac{4}{3} \\ 0 & -20 & -24 & -49 \end{array}\right) = \left(\begin{array}{ccc|c} 1 & 0 & -\frac{1}{3} & \frac{2}{3} \\ 0 & 1 & \frac{4}{3} & \frac{4}{3} \\ 0 & 0 & \frac{8}{3} & -\frac{67}{3} \end{array}\right) =$$

$$= \left(\begin{array}{ccc|c} 1 & 0 & -\frac{1}{3} & \frac{2}{3} \\ 0 & 1 & \frac{4}{3} & \frac{4}{3} \\ 0 & 0 & 1 & -\frac{67}{8} \end{array}\right) = \left(\begin{array}{ccc|c} 1 & 0 & 0 & -\frac{51}{24} \\ 0 & 1 & 0 & \frac{75}{6} \\ 0 & 0 & 1 & -\frac{67}{8} \end{array}\right)$$

$$\begin{cases} a = -2,125 \\ b = 12,5 \\ c = -8,375 \end{cases}$$

Задание 2

x - сухая масса

y_1 - вода

1) $\begin{cases} x + y_1 = 100 \\ \frac{x}{x+y} = 0{,}01 \end{cases} \rightarrow \begin{cases} y_1 = 100 - x \\ \frac{x}{100} = 0{,}01 \end{cases} \Rightarrow \begin{cases} x = 1 \text{ кг} \\ y_1 = 99 \text{ кг} \end{cases}$

2) $\frac{1}{1+y_2} = 0{,}02 \rightarrow y_2 = 49$ кг

3) $x + y_2 = 50$ кг

Задание 3

1) $2^x = 256$

$2^x = 2^8$

$x = 8$

2) $2^x = 300$

$x = \log_2 300$

3) $\log_8 2^{8x-4} = 4$

$\log_8 2^{8x-4} = \log_8 2^{3 \cdot 4}$

$2^{8x-4} = 2^{12}$

$8x - 4 = 12$

$x = 2$

4) $3^{\log_3 (5x-5)} = 5$

$\sqrt{5x-5} = 5$

$5x - 5 = 25$

$x = 6$

Задание 4

6) $\log_4 16 = 2$

7) $\log_5 \frac{1}{25} = -2$

8) $\log_{25} 5 = \frac{1}{2}$

9) $\log_3 \sqrt{27} = \frac{3}{2}$

10) $\log_2 12 - \log_2 3 = 2$

11) $\log_6 12 + \log_6 3 = 2$

12) $e^{\ln 5} = 5$

13) $\frac{\log_2 225}{\log_2 15} = \log_{15} 225 = 2$

14) $\log_4 32 + \log_{0,1} 10 = \frac{5}{2} - 1 = 1,5$

15) $9^{\log_3 \sqrt{5}} = 3^{\log_3 5} = 5$