

1)

$$11^{0,3-3x} = 1331 = 11^3$$

$$0,3 - 3x = 3$$

$$3x = 0,3 - 3 = -2,7$$

$$\text{Ответ } x = -0,9$$

2)

$$(81 * \sqrt[6]{3})^{12x-9} = 729 = 3^6$$

$$\left(3^4 * 3^{\frac{1}{6}}\right)^{12x-9} = 3^6$$

$$\left(4 + \frac{1}{6}\right) * (12x - 9) = 6$$

$$\frac{25}{6} * (12x - 9) = 6$$

$$12x - 9 = \frac{36}{25}$$

$$x = \frac{\frac{36}{25} + 9}{12} = \frac{3}{25} + \frac{3}{4} = \frac{12 + 75}{100} = 0,87$$

$$\text{Ответ } x = 0,87$$

3)

$$2,25^{x-4} = 0,5\sqrt{6}$$

$$(1,5^2)^{x-4} = \frac{1}{2}\sqrt{3*2}$$

$$\left(\frac{3}{2}\right)^{2x-8} = \left(\frac{3}{2}\right)^{\frac{1}{2}}$$

$$2x - 8 = \frac{1}{2}$$

$$x = \frac{8 + \frac{1}{2}}{2} = 4,25$$

$$\text{Ответ } x = 4,25$$

4)

$$5^{\frac{3x+9}{x}} - 5^{\frac{x+9}{x}} = 0,96$$

$$5^{3+\frac{9}{x}} - 5^{1+\frac{9}{x}} = 0,96$$

$$125 * 5^{\frac{9}{x}} - 5 * 5^{\frac{9}{x}} = 0,96$$

$$120 * 5^{\frac{9}{x}} = 0,96$$

$$5^{\frac{9}{x}} = \frac{0,96}{120} = 0,008 = 5^{-3}$$

$$\frac{9}{x} = -3$$

$$x = -3$$

$$\text{Ответ } x = -3$$

5)

$$10^{4x} - 133 \cdot 100^x + 1000 = 0$$

$$(100^x)^2 - 133 \cdot 100^x + 1000 = 0$$

$$100^x = t > 0$$

$$t^2 - 133 \cdot t + 1000 = 0$$

$$D = 133 \cdot 133 - 4 \cdot 1000 = 13689 = 117^2$$

$$t_1 = \frac{133 - 117}{2} = 8 = 100^{x_1}; x_1 = \frac{\ln(8)}{\ln(100)}$$

$$t_2 = \frac{133 + 117}{2} = 125 = 100^{x_2}; x_2 = \frac{\ln(125)}{\ln(100)}$$

$$x_1 + x_2 = \frac{\ln(8)}{\ln(100)} + \frac{\ln(125)}{\ln(100)} = \frac{\ln(1000)}{\ln(100)} = \frac{3 \cdot \ln(10)}{2 \cdot \ln(10)} = \frac{3}{2} = 1,5$$

Ответ $x_1 + x_2 = 1,5$