

$$5^{\frac{2x+13}{x}} - 5^{\frac{13}{x}} = 600$$

$x \neq 0$ (в противном случае уравнение не существовало)

$$5^{\frac{2x}{x} + \frac{13}{x}} - 5^{\frac{13}{x}} = 600$$

$$5^2 \cdot 5^{\frac{13}{x}} - 5^{\frac{13}{x}} = 600$$

$$5^{\frac{13}{x}} (5^2 - 1) = 600 \quad | : 24$$

$$5^{\frac{13}{x}} = 25$$

$$5^{\frac{13}{x}} = 5^2$$

$$\frac{13}{x} = 2$$

$$x = \frac{13}{2} = 6,5$$

Ответ: 6,5

$$81^{3x-5,5} = 2,25 \cdot 2^{6x-10}$$

$$\textcircled{1} (9^2)^{3x-5,5} = 2,25 \cdot 2^{6x-10}$$

$$9^{6x-11} = 2,25 \cdot 2^{6x-10}$$

$$9^{6x-10-1} = 2,25 \cdot 2^{6x-10}$$

$$9^{6x-10} \cdot 9^{-1} = 2,25 \cdot 2^{6x-10} \quad \left. \begin{array}{l} : 2^{6x-10} \\ : 9^{-1} (\cdot 9) \end{array} \right\}$$

$$\frac{9^{6x-10}}{2^{6x-10}} = 2,25 \cdot 9$$

$$2,25 = \frac{225}{100} = \frac{9}{4}$$

$$2,25 \cdot 9 = \frac{9}{4} \cdot 9 = \frac{81}{4} = \left(\frac{9}{2}\right)^2$$

$$\left(\frac{9}{2}\right)^{6x-10} = \left(\frac{9}{2}\right)^2$$

$$6x-10 = 2$$

$$x = 2$$

$$\textcircled{2} 81^{3x-5,5} = 2,25 \cdot 2^{2(3x-5)}$$

$$81^{3x} \cdot 81^{-5,5} = 2,25 \cdot 4^{3x} \cdot 4^{-5}$$

$$\text{Делим: } 81^{-5,5}, 4^{3x}$$

$$\frac{81^{3x}}{4^{3x}} = \frac{9}{4} \cdot \frac{1}{4^5} \cdot 81^{5,5}$$

$$5,5 = 5 + 0,5$$

$$81^{5,5} = 81^5 \cdot \sqrt{81}$$

$$\left(\frac{81}{4}\right)^{3x} = \frac{9}{46} \cdot 81^5 \cdot 9$$

$$\left(\frac{81}{4}\right)^{3x} = \frac{81^6}{46} = \left(\frac{81}{4}\right)^6$$

$$3x = 6 \Rightarrow x = 2$$

Ответ: 2

$$\textcircled{3} 81^{3x-5,5} = 2,25 \cdot 2^{2(3x-5)}$$

$$\frac{4^{3x-5} \cdot 4^{-0,5}}{4^{3x-5,5}} \cdot \frac{1}{\sqrt{4}} = \frac{1}{2}$$

$$\left(\frac{81}{4}\right)^{3x-5,5} = \frac{9}{4} \cdot 2$$

$$\left(\frac{9}{2}\right)^{2(3x-5,5)} = \frac{9}{2} \Rightarrow 6x-11 = 1$$

$$x = 2$$