

$$\sqrt{8^{x-3}} = \sqrt[3]{4^{2-x}}$$

$$\left(8^{x-3}\right)^{\frac{1}{2}} = \left(4^{2-x}\right)^{\frac{1}{3}}$$

$$8^{\frac{1}{2}(x-3)} = 4^{\frac{1}{3}(2-x)}$$

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

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

$$2^{3 \cdot \frac{1}{2}(x-3)} = 2^{2 \cdot \frac{1}{3}(2-x)}$$

$$3 \cdot \frac{1}{2}(x-3) = 2 \cdot \frac{1}{3}(2-x)$$

$$\frac{3}{2}(x-3) = \frac{2}{3}(2-x)$$

$$\frac{3}{2}(x-3) - \frac{2}{3}(2-x) = 0$$

$$\frac{3}{2}(x-3) + \frac{2}{3}(x-2) = 0$$

$$\left(\frac{3}{2}x - \frac{9}{2}\right) + \left(\frac{2}{3}x - \frac{4}{3}\right) = 0$$

$$\frac{3}{2}x - \frac{9}{2} + \frac{2}{3}x - \frac{4}{3} = 0$$

$$\frac{13}{6}x - \frac{35}{6} = 0$$

$$\frac{13}{6}x = \frac{35}{6}$$

$$x = \frac{35}{6} : \frac{13}{6}$$

$$x = \frac{35}{13}$$


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$$\sqrt{2^x} \sqrt{6^x} = 36$$

$$(2^x)^{\frac{1}{2}} (6^x)^{\frac{1}{2}} = 36$$

$$2^{\frac{1}{2}x} 6^{\frac{1}{2}x} = 36$$

$$2^{\frac{1}{2}x} (2 \cdot 3)^{\frac{1}{2}x} = 36$$

$$2^{\frac{1}{2}x} \left( 2^{\frac{1}{2}x} 3^{\frac{1}{2}x} \right) = 36$$

$$2^{\frac{1}{2}x} 2^{\frac{1}{2}x} 3^{\frac{1}{2}x} = 36$$

$$2^{\frac{1}{2}x + \frac{1}{2}x} 3^{\frac{1}{2}x} = 36$$

$$2^x 3^{\frac{1}{2}x} = 36$$

$$\left(2 \cdot 3^{\frac{1}{2}}\right)^x = 36$$

$$(2\sqrt{3})^x = 36$$

$$x = \log_{2\sqrt{3}}(36)$$

$$\left(\frac{3}{7}\right)^{3x+1} = \left(\frac{7}{3}\right)^{5x-3}$$

$$\left(\frac{3}{7}\right)^{3x+1} = \left(\left(\frac{3}{7}\right)^{-1}\right)^{5x-3}$$

$$\left(\frac{3}{7}\right)^{3x+1} = \left(\frac{3}{7}\right)^{(-1)(5x-3)}$$

$$3x+1 = -(5x-3)$$

$$3x+1 = -5x+3$$

$$3x+1+5x=3$$

$$8x+1=3$$

$$8x=3-1$$

$$8x=2$$

$$x=\frac{1}{4}$$

$$3^{6-x}=3^{3x-2}$$

$$6-x=3x-2$$

$$6-x-3x=-2$$

$$6-4x=-2$$

$$-4x=-2-6$$

$$4x=2+6$$

$$4x=8$$

$$x=2$$

$$\left(\frac{1}{7}\right)^{2x^2+2x-0,5}=\frac{\sqrt{7}}{7}$$

$$(7^{-1})^{2x^2+2x-0,5}=(7^{-1})^{\frac{1}{2}}$$

$$7^{(-1)(2x^2+2x-0,5)}=7^{-\frac{1}{2}}$$

$$-1(2x^2+2x-0,5)=-\frac{1}{2}$$

$$-(2x^2 + 2x - 0,5) = -\frac{1}{2}$$

$$-2x^2 - 2x + 0,5 = -\frac{1}{2}$$

$$-2x^2 - 2x + 0,5 + \frac{1}{2} = 0$$

$$-2x^2 - 2x + 1 = 0$$

$$2x^2 + 2x - 1 = 0$$

Находим дискриминант.

$$D = b^2 - 4ac = 2^2 - 4 \cdot 2(-1) = 12$$

$$x_{1,2} = \frac{-b \pm \sqrt{D}}{2a}$$

$$x_1 = \frac{-2 - 2\sqrt{3}}{2 \cdot 2} = \frac{-1 - \sqrt{3}}{2}; x_2 = \frac{-2 + 2\sqrt{3}}{2 \cdot 2} = \frac{-1 + \sqrt{3}}{2}$$


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$$\sqrt{3^x} = 9$$

$$(3^x)^{\frac{1}{2}} = 9$$

$$3^{\frac{1}{2}x} = 9$$

$$3^{\frac{1}{2}x} = 3^2$$

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

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

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

$$x = 4$$


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$$7^{x+2} + 4 \cdot 7^{x+1} = 539$$

$$7^{x+2} + 4 \cdot 7^{x+1} - 539 = 0$$

Путем подбора находим решение.

$$x = 1$$

Других решений нет, так как функция, соответствующая данному уравнению, является монотонной.