

$$1) \frac{25^{x-1}}{2 \cdot 5^{2-x}} = 12,5 \quad | \cdot 2 \cdot 5^{2-x}$$

$$25^{x-1} = 12,5 \cdot 2 \cdot 5^{2-x}$$

$$25^{x-1} = 25 \cdot 5^{2-x}$$

$$(5^2)^{x-1} = 5^2 \cdot 5^{2-x}$$

$$5^{2x-2} = 5^{2+2-x} \Rightarrow 2x-2 = 4-x$$

$$\Rightarrow 2x-2 = 4-x$$

$$| +x$$

$$| +2$$

$$| :3$$

$$3x = 6$$

$$\underline{\underline{x = 2}}$$

$$2) \frac{2^{x+1} + 2^{x+3}}{2} = 320$$

$$2^x \cdot 2^1 + 2^x \cdot 2^3 = 320$$

$$2 \cdot 2^x + 8 \cdot 2^x = 320$$

$$2^x \cdot (2+8) = 320$$

$$2^x \cdot 10 = 320 \quad | :10$$

$$2^x = 32$$

$$\underline{\underline{x = 5}}$$

$$3) \frac{81^x + 27}{28} = 28 \cdot 9^x$$

$$81^x + 27 - 28 \cdot 9^x = 0$$

$$81^x - 28 \cdot 9^x + 27 = 0$$

$$(9^x)^2 - 28 \cdot 9^x + 27 = 0$$

$$t^2 - 28t + 27 = 0$$

$$(t-27)(t-1) = 0$$

$$\underline{t = 27} \quad \vee \quad \underline{t = 1}$$

$$9^x = 27$$

$$9^x = 1$$

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

$$9^x = 9^0$$

$$2x = 3 \Rightarrow \underline{\underline{x = \frac{3}{2}}}$$

$$\underline{\underline{x = 0}}$$

$$\boxed{(a^{m \cdot n}) = a^{m \cdot n}}$$

$$\Rightarrow 81^x = (9^2)^x = 9^{2x} = (9^x)^2$$

$$\text{SUBSTITUTE } \underline{\underline{9^x = t}}$$

$$4) \quad 4^{x-2} - 3 \cdot 4^{\frac{x-3}{2}} - 1 = 0$$

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

$$4^x \cdot 4^{-2} - 3 \cdot 2^x \cdot 2^{-3} - 1 = 0$$

$$4^x \cdot \frac{1}{16} - 3 \cdot 2^x \cdot \frac{1}{8} - 1 = 0 \quad | \cdot 16$$

$$4^x - 6 \cdot 2^x - 16 = 0$$

$$(2^x)^2 - 6 \cdot 2^x - 16 = 0$$

substituce: $\boxed{2^x = y}$

$$y^2 - 6y - 16 = 0$$

$$(y-8)(y+2) = 0$$

$$\underline{y=8} \quad \vee \quad \underline{y=-2}$$

$$2^x = 8$$

$$\underline{x=3}$$

$$2^x = -2 \Rightarrow \text{rovnice nemá řešení}$$

$$x \notin \mathbb{R}$$

$$5) \quad \sqrt[5]{0,8} \cdot \left(\frac{16}{25}\right)^x = \frac{15}{12} \cdot 0,64^{2-3x}$$

$$0,8 = \frac{8}{10} = \frac{4}{5}$$

$$\frac{16}{25} = \left(\frac{4}{5}\right)^2$$

$$\frac{15}{12} = \frac{5}{4} = \left(\frac{4}{5}\right)^{-1}$$

$$0,64 = 0,8^2 = \left(\frac{4}{5}\right)^2$$

$$\left(\frac{4}{5}\right)^{\frac{1}{5}} \cdot \left(\frac{4}{5}\right)^{2x} = \left(\frac{4}{5}\right)^{-1} \cdot \left(\left(\frac{4}{5}\right)^2\right)^{2-3x}$$

$$\left(\frac{4}{5}\right)^{\frac{1}{5}+2x} = \left(\frac{4}{5}\right)^{-1+4-6x}$$

$$\frac{1}{5} + 2x = -1 + 4 - 6x \quad | +6x$$

$$8x = 3 - \frac{1}{5}$$

$$8x = \frac{14}{5} \quad | :8$$

$$x = \frac{14}{8 \cdot 5} = \frac{7}{4 \cdot 5} = \underline{\underline{\frac{7}{20}}}$$