S 79 Nr. 3

a) $(7^{2x-1})^2 = 36 \Rightarrow 7^{4x-2} = 36 \Rightarrow (4x-2)\log(7) = \log(36)$

$\Rightarrow 4x-2 = \frac{\log(36)}{\log(7)} \Rightarrow 4x = \frac{\log(36)}{\log(7)} + 2 \Rightarrow x = \frac{\log(36)}{4\log(7)} + \frac{2}{4}$

$x \approx 0{,}960$

oder

$\sqrt{(7^{2x-1})^2} = \sqrt{36} \Rightarrow 7^{2x-1} = \pm 6 \Rightarrow (2x-1)\cdot\log(7) = \log(6)$

$\Rightarrow 2x-1 = \frac{\log(6)}{\log(7)} \Rightarrow 2x = \frac{\log(6)}{\log(7)} + 1 \Rightarrow x = \frac{\log(6)}{2\log(7)} + \frac{1}{2} \approx 0{,}960$

oder

$(7^{2x-1})^2 = 7^{4x-2} = 7^{4x} \cdot \frac{1}{7^2} = 36 \Rightarrow 7^{4x} = 36 \cdot 7^2$

$\Rightarrow 4x\log(7) = \log(36\cdot 7^2) \Rightarrow 4x = \frac{\log(36\,7^2)}{\log(7)} \Rightarrow x = \frac{\log(36\,7^2)}{4\cdot\log(7)}$

$x \approx 0{,}960$

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b) $5\,2^{-3x+4} = 1 \Rightarrow 2^{-3x+4} = \frac{1}{5} \Rightarrow (-3x+4)\log(2) = \log(\frac{1}{5})$

$\Rightarrow -3x+4 = \frac{\log(\frac{1}{5})}{\log(2)} \Rightarrow -3x = \frac{\log(\frac{1}{5})}{\log(2)} - 4 \Rightarrow x = \frac{\log(\frac{1}{5})}{-3\cdot\log(2)} + \frac{4}{3}$

$x \approx 2{,}107$

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c) $4 - 2^x = 4100 - 5\,2^x \Rightarrow 4 - 2^x + 5\,2^x = 4100 \Rightarrow 4\,2^x = 4096$

$\Rightarrow 2^x = \frac{4096}{4} \Rightarrow x\log(2) = \log(\frac{4096}{4}) \Rightarrow x = \frac{\log(\frac{4096}{4})}{\log(2)} = 10$

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d) $2\cdot 4^x + 3044 = 14\cdot 4^x - 28 \Rightarrow 3044 + 28 = 14\,4^x - 2\,4^x$

$\Rightarrow 3072 = 14\cdot 4^x - 2\,4^x \Rightarrow 3072 = 12\cdot 4^x \Rightarrow 4^x = \frac{3072}{12}$

$\Rightarrow x\cdot\log(4) = \log(\frac{3072}{12}) \Rightarrow x = \frac{\log(\frac{3072}{12})}{\log(4)} = 4$