

TBM GE, 11.3.2016

① a) $5 \cdot 3^{x+1} = 6 \cdot 5^x - 5 \cdot 3^{x-1}$
 $5 \cdot 3^1 \cdot 3^x = 6 \cdot 5^x - 5 \cdot 3^{-1} \cdot 3^x$
 $15 \cdot 3^x = 6 \cdot 5^x - \frac{5}{3} \cdot 3^x$
 $15 \cdot 3^x + \frac{5}{3} \cdot 3^x = 6 \cdot 5^x$
 $3^x \left(15 + \frac{5}{3} \right) = 6 \cdot 5^x$

$$\frac{\frac{50}{3}}{6} = \frac{5^x}{3^x} = \left(\frac{5}{3} \right)^x$$

$$\frac{25}{9} = \left(\frac{5}{3} \right)^x$$

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

b) $2^{x+5} + 2^{x+3} + 2^{x-4} = 40.0625$
 $2^x (2^5 + 2^3 + 2^{-4}) = 40.0625$ (1P.)

$$2^x \cdot 40.0625 = 40.0625$$
 (2P.)

$$2^x = 1$$

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

$$c) \quad 2^{2x} - 3 \cdot 2^x = 40$$

$$(2^x)^2 - 3 \cdot 2^x - 40 = 0$$

$$2^x = z; \quad (2^x)^2 = z^2$$

$$z^2 - 3 \cdot z - 40 = 0$$

$$(z + 5)(z - 8) = 0$$

$$z_1 = -5 = 2^x \rightarrow \text{keine Lösung}$$

$$z_2 = 8 = 2^x \Rightarrow \underline{\underline{x = 3}}$$

$$\textcircled{2} \quad a) \quad \ln(3-x) = 2 - \ln(x-5)$$

$$3-x > 0$$

$$x < 3$$

$$x-5 > 0$$

$$x > 5$$

$$\Rightarrow \mathbb{D} = \{ \}$$

$$\left(\begin{array}{l} \ln((3-x)(x-5)) = 2 \\ (3-x)(x-5) = e^2 \end{array} \right)$$

↓
Gleichung kein gar
keine Lösung hat!

$\mathbb{D} \rightarrow \mathbb{A.P.}$

$$b) \log(x) - \log_3(x) = 2 \cdot \log(3) - 2$$

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

$$\left(\frac{\log_3(x)}{\log_3(10)} - \log_3(x) = 2 \cdot \frac{\log_3(3)}{\log_3(10)} - 2 \right)$$

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

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

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

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

$$\log(x) = 2 \cdot \log(3)$$

$$\log(x) = \log(3^2) / 10^x$$

$$\underline{\underline{x = 3^2 = 9}}$$

$$\begin{aligned} x+5 > 0 \\ x > -5 \end{aligned}$$

$$\begin{aligned} x-4 > 0 \\ x > 4 \end{aligned}$$

$$c) \log(x+5) = 1 + \log(x-4)$$

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

$$D = \{x \in \mathbb{R} / x > 4\}$$

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$$\frac{x+5}{x-4} = 10$$

$$x+5 = 10x-40$$

$$45 = 9x$$

$$5 = x$$

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