




Mathe macht
Spaß



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$$2) a) \quad 3 - \frac{1}{12} \cdot (2 + \frac{1}{12}) - \frac{3}{10} + \frac{1}{12} (\frac{3}{2} - 1) + \frac{13}{10}$$

$$3 - 1 - \frac{1}{24} - \frac{3}{10} + \frac{1}{24} + \frac{13}{10} = \underline{2} + \underline{1} = 3$$

$$b) \quad \frac{\frac{x}{y} - 1 + \frac{y}{4x}}{\frac{1}{4xy} - \frac{1}{8x^2}} = \frac{\frac{4x^2 - 4xy + y^2}{4xy}}{\frac{2x - y}{8x^2y}}$$

$$\frac{(2x - y)^2}{4xy} \cdot \frac{8x^2y}{(2x - y)} = (2x - y) \cdot 2x = 4x^2 - 2xy$$

$$3) a) \quad x = 3 + \sqrt{3x-5} \quad | -3$$

→ Bruch

→ LOG

→ $\sqrt{\quad}$

↓

Nullstellen

↓

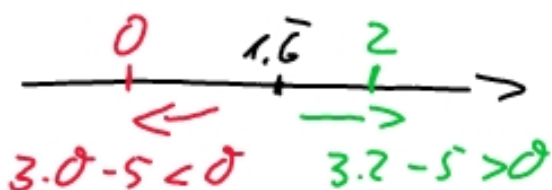
Bereiche

$$\mathbb{D} = \mathbb{R}^{\geq 5/3}$$



$$3x-5=0$$

$$x = 5/3 = 1\frac{2}{3} = 1.\bar{6}$$



$$x-3 = \sqrt{3x-5} \quad | \uparrow^2$$

$$(x-3)^2 = 3x-5$$

$$x^2 - 6x + 9 = 3x - 5 \quad | -3x + 5$$

$$x^2 - 9x + 14 = 0$$

$$(x-7) \cdot (x-2) = 0$$

$$x_1 = 7 \vee x_2 = 2$$

$$\mathbb{L} = \{7\}$$

$$x_1 = 2 : 2 = 3 + \sqrt{6-5}$$

$$2 = 3 + \sqrt{1} \quad \checkmark$$

$$x_2 = 7 : 7 = 3 + \sqrt{16-5}$$

$$7 = 3 + \sqrt{11} \quad \checkmark$$

$$3) 6) \quad \frac{(2x+4)^2}{4} = (-3) \cdot \frac{x+6-x^2}{x-3} \quad \mathbb{D} = \mathbb{R} \setminus \{3\}$$

$$\frac{4x^2 + 16x + 16}{4} = 3 \cdot \frac{x^2 - x - 6}{x-3}$$

$$\frac{4 \cdot (x^2 + 4x + 4)}{4} = 3 \cdot \frac{(x-3)(x+2)}{x-3}$$

$$(x+2)^2 = 3 \cdot (x+2) \quad | : (x+2) \quad x_1 = -2$$

$$x+2 = 3 \quad x_2 = 1 \quad \mathcal{L} = \{-2; 1\}$$

Potenz

$$(x^3)^5 = x^{15}$$

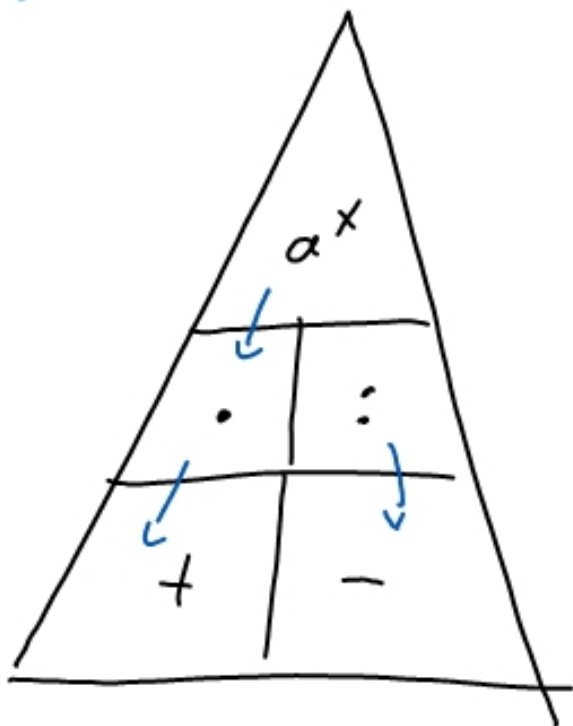
$$x^3 \cdot x^5 = x^8$$

$$\frac{x^3}{x^5} = x^{3-5} = x^{-2}$$

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

$$1/4^2$$

$$x^{1/4} = \sqrt[4]{x}$$



$$\log 5 + \log 3 = \log 15$$

$$\log 3 - \log 5 = \log 3/5$$

$$3 \cdot \log 5 = \log 5^3 \\ = \log 125 \\ \approx 2, \dots$$

LOG

$$a^x = b \Leftrightarrow \log_a b = x$$

$$\begin{aligned}
\sqrt[3]{x^2 \cdot \sqrt{x^5} \cdot \sqrt[3]{x}} &= (x^2)^{1/3} \left((x^5)^{1/2} \right)^{1/3} \left((x^{1/2})^{1/2} \right)^{1/3} \\
&= x^{2/3} \cdot x^{5/6} \cdot x^{1/12} \\
&= x^{2/3 + 5/6 + 1/12} \\
&= x^{\frac{8+10+1}{12}} = x^{19/12} = \sqrt[12]{x^{19}}
\end{aligned}$$

$$2 \cdot \log 0,001 \Rightarrow 2 \cdot \log 10^{-3} = 2(-3) = -6$$

$$16^{\log 3} = (2^4)^{\log 3} = 2^{4 \cdot \log 3} = 2^{\log 3^4}$$

$$\ln \sqrt[3]{e} = \ln e^{-1/3} = -1/3 \quad = 3^4 = 81$$