Mathe macht Spaß

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2) a) $3 - \frac{1}{2} \cdot \left(2 + \frac{1}{a}\right) - \frac{3}{10} + \frac{1}{a}\left(\underbrace{\frac{3}{2} - 1}_{\frac{1}{2}}\right) + 1{,}3 \quad + \frac{13}{10}$

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

$a^2 - 2ab + b^2$

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

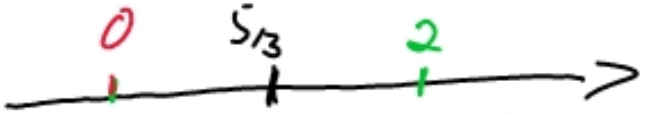
$$\frac{(2x-y)^2}{4xy} \cdot \frac{\overbrace{8x^2y}^{2x}}{2x-y} = 2x(2x-y)$$

$$= 4x^2 - 2xy$$

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

$3x - 5 = 0$

$x = 5/3 = 1\,2/3 = 1{,}6\overline{}$



$0 - 5 < 0$ ✗ $\quad 6 - 5 > 0$ ✓

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

Definitionsbereich.

Bruch (x im Nenner) $\neq 0$

$\log(x..)$ > 0

$\sqrt{x..}$ ≥ 0

Nullstellen ↓ Bereiche

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

$x - 3 = \sqrt{3x-5}$ | $()^2$

$(x-3)^2 = 3x-5$ | $\overline{}$

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

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

$(x-7)(x-2) = 0$ Vieta

$a \cdot s = 14$

$a + s = -9$

$x_1 = 2 \quad \vee \quad x_2 = 7 \quad \rightarrow \geq 5/3$, könnte Lösung sein

$x_1 = 2 : \quad 2 = 3 + \sqrt{6-5} = 3 + \sqrt{1}$ ↯

$x_2 = 7 : \quad 7 = 3 + \sqrt{21-5} = 3 + \sqrt{16} = 7$ ✓

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

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

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

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

$$(x+2)^2 = 3\cdot(x+2) \qquad /:(x+2) \qquad x_1=-2$$

$$x+2=3 \qquad x_2=1$$

$$\mathbb{L}=\{-2;1\}$$

Potenz

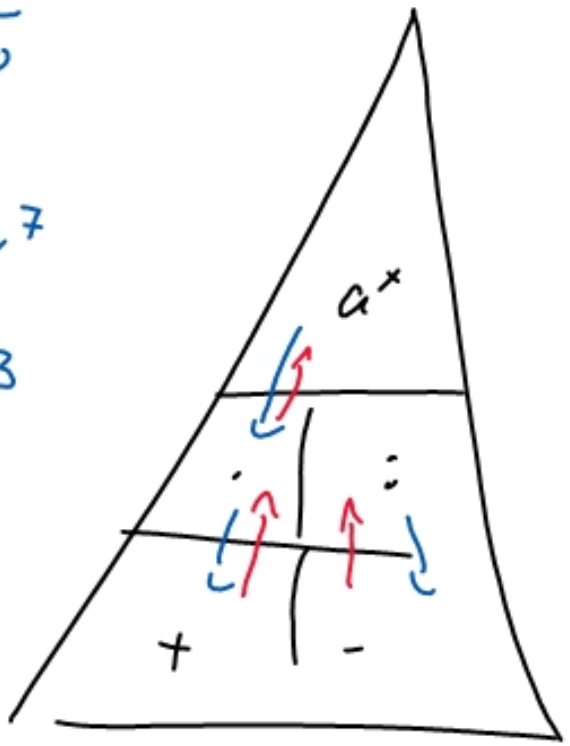
$(x^2)^5 = x^{2 \cdot 5} = x^{10}$

$x^2 \cdot x^5 = x^{2+5} = x^7$

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

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

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



$3 \cdot \log 5 = \log 5^3$

$\log 125$

$\log 3 - \log 5$

$\log 3/5$

$\log 3 + \log 5$

$\log 3.5 = \log 15$

LOG

$a^x = 5 \iff x = \log_a 5$

$$\sqrt[3]{x^2 \cdot \sqrt{x} \cdot \sqrt[5]{x^6}} = (x^{\cdot})^{1/3} \cdot \left((x)^{1/3}\right)^{1/3} \left(\left(\left(x^6\right)^{1/5}\right)^{1/5}\right)^{1/3}$$

$$x^{2/3} \cdot x^{1/16} \cdot x^{1/5}$$

$$x^{2/3 + 1/16 + 1/5}$$

$$x^{\frac{20+5+6}{30}} = x^{31/30} = \sqrt[30]{x^{31}}$$

$$16^{\ld 3} = (2^4)^{\ld 3} = 2^{4 \cdot \ld 3} = 2^{\ld 3^4} = 3^4 \rightarrow 81$$

Basistransformation — Potenzgesetz — log-Gesetz