

$$\sqrt{3-2x} = 7$$

1. Frage: Was ist  $x$  in Bezug auf erlaubte Rechenoperationen?

$$3-2x \geq 0$$

$$\Leftrightarrow -2x \geq -3 \quad | :(-2)$$

$$\Leftrightarrow x \leq \frac{3}{2}$$

$$D = \{x \in \mathbb{R} \mid x \leq \frac{3}{2}\} = (-\infty, \frac{3}{2}]$$

$$(\mathbb{I} \subset D)$$

2. Frage: Welches  $x$  löst die Gleichung?

$$\sqrt{3-2x} = 7$$

$$L = \{-27\}$$

$$\Rightarrow 3-2x = 49$$

$$L = \{-23\}$$

$$\sqrt{x} = 7$$

$$\Leftrightarrow x = 49$$

$$\sqrt[10]{7^2} = x$$

vs.

$$x^2 = 4$$

$$\Leftrightarrow x = 2$$

$$\vee x = -2$$

$$\sqrt{4} = 2$$

$$\sqrt{4} = -2$$

$$\sqrt[2]{5x^2 - 8} = x$$

$$D = \left( \mathbb{R} \setminus \left( -\sqrt{\frac{8}{5}}, \sqrt{\frac{8}{5}} \right) \right) \cap \mathbb{R}_0^+$$

$$\underbrace{\sqrt{5x-8}}_{\geq 0} = x \quad \text{mit } \geq 0$$

$$, D = \left( -\frac{1}{5}, \frac{1}{5} \right) \cap \mathbb{R}_0^+$$

$$\left[ \begin{array}{l} \text{aber} \\ \sqrt[3]{5x^2-8} = x \\ \left( \sqrt[3]{-27} = -3 \right) \checkmark \end{array} \right] , D = \mathbb{R}$$

$$\begin{aligned} \sqrt{5x^2-8} &= x \rightarrow \mathbb{L}_1 \\ \Rightarrow 5x^2-8 &= x^2 \rightarrow \mathbb{L}_2 \\ \Leftrightarrow \sqrt{5x^2-8} &= \sqrt{x^2} = |x| \end{aligned}$$

$$\mathbb{L}_1 \subset \mathbb{L}_2$$

$$\sqrt{x^2} = |x|$$

$$\text{aber } (\sqrt{x})^2 = x \quad \text{da } x \geq 0$$

$$\boxed{\text{aber } (\sqrt{x})^2 = x, \text{ da } x \geq 0}$$

$$\sqrt{1+\sqrt{x}} = \sqrt{x-1}$$

$$\Rightarrow \sqrt{x} = \underbrace{x-2}_{\geq 0}$$

$$\underbrace{x-2}_{\geq 0} \geq 0$$

$$\Leftrightarrow x \geq 2$$

$$D = [0, +\infty) \cap [1, +\infty)$$

$$= [1, +\infty)$$

$$\Rightarrow D = [1, +\infty) \cap [2, +\infty)$$

$$= [2, +\infty)$$

$$1 \notin D, \text{ aber } 4 \in D.$$

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$|3x-2| = \begin{cases} 3x-2, & 3x-2 \geq 0 \\ -(3x-2), & 3x-2 < 0 \end{cases}$$

$$= \begin{cases} 3x-2, & x \geq \frac{2}{3} \quad \rightarrow \text{1. Fall} \\ 2-3x, & x < \frac{2}{3} \quad \rightarrow \text{2. Fall} \end{cases}$$

BETRAG  $\rightarrow$  FALLUNTERSCHIEDUNG!!!

$$|3x-2| = |x-5|$$

$$\begin{array}{l}
 \underline{1. Fall:} \quad x \geq \frac{2}{3} \quad \wedge \quad x > 5 \quad \Rightarrow \quad x > 5 \\
 \underline{2. Fall:} \quad x < \frac{2}{3} \quad \wedge \quad x < 5 \quad \Rightarrow \quad \frac{2}{3} \leq x < 5 \\
 \underline{3. Fall:} \quad \cancel{x < \frac{2}{3} \quad \wedge \quad x \geq 5} \\
 \underline{3. Fall:} \quad x < \frac{2}{3} \quad \wedge \quad x < 5 \quad \Rightarrow \quad x < \frac{2}{3}
 \end{array}$$

$\Downarrow$

$$\begin{aligned}
 |3x - 2| &= -(3x - 2) & |x - 5| &= -(x - 5) = 5 - x \\
 &= 2 - 3x
 \end{aligned}$$

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Übung: 3)  $|x+1| - |x-1| = 0$

$$1) |x| + |x-1| + |x+1| = 2$$

$$2) |1 - |x-1|| = 0$$


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$$2^x = 2^{x^2+1} \quad | \log_2 \quad | \ln$$

$$\Leftrightarrow x = x^2 + 1$$

$$\Leftrightarrow \ln(2^x) = \ln(2^{x^2+1})$$

$$\Leftrightarrow x \ln(2) = (x^2 + 1) \ln(2)$$


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$$2^x = 3^x$$

$$| \ln$$

$$(\Rightarrow) x / \ln 2 = x / \ln 3 \quad | : x, x \neq 0$$

$$(\Rightarrow) \ln 2 = \ln 3$$

$$\Rightarrow \quad \mathbb{L} = \{0\}$$