Buch S 143 / 3a $G = \mathbb{R}$

$x + \sqrt{x} - 1 = 0 \mid +1$ $\quad D = \{x \mid x \geq 0\}$

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

$\Leftrightarrow \sqrt{x} = 1 - x \mid ^2$

} Isolieren des Wurzelterms!

$\Rightarrow \sqrt{x}^2 = (1-x)^2$

$\Rightarrow x = 1 - 2x + x^2$

$\Leftrightarrow 0 = 1 - 3x + x^2$

$\Leftrightarrow x^2 - 3x + 1 = 0$ $\quad \mid a = 1,\ b = -3,\ c = 1$

$\Leftrightarrow x_{1/2} = \frac{3 \pm \sqrt{5}}{2}$

$D = (-3)^2 - 4 \cdot 1 \cdot 1$

$D = 5$

$\Leftrightarrow x = \frac{3+\sqrt{5}}{2} \vee x = \frac{3-\sqrt{5}}{2}$

Probe:

$\frac{3+\sqrt{5}}{2} + \sqrt{\frac{3+\sqrt{5}}{2}} - 1 = 0$

$3{,}24 = 0$ (f)

$\frac{3-\sqrt{5}}{2} + \sqrt{\frac{3-\sqrt{5}}{2}} - 1 = 0$

$0 = 0$ (w)

$\Rightarrow \mathbb{L} = \left\{\frac{3-\sqrt{5}}{2}\right\}$

143 / 3b $\quad \mathbb{G} = \mathbb{R} \quad \mathbb{D} = \{x \mid x \geq 0\}$

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

$$\Leftrightarrow 2\sqrt{x} = 2x + 2 \quad | :2$$

$$\Rightarrow \sqrt{x} = x + 1 \quad | ^2$$

$$\Rightarrow x = x^2 + 2x + 1 \quad \text{(Binom: } (x+1)^2\text{)}$$

$$\Leftarrow 0 = x^2 + x + 1$$

$$a = 1, \quad b = 1, \quad c = 1$$

$$D = 1^2 - 4 \cdot 1 \cdot 1$$

$$D = -3$$

Da $D < 0 \Rightarrow \mathbb{L} = \emptyset$

143/3c $\mathbb{G} = \mathbb{R}$ $\mathbb{D} = \{x \mid x \geq -2\}$

$$\sqrt{2+x} + 4 = x \quad | -4$$

$$\Leftrightarrow \sqrt{2+x} = x - 4 \quad |^2$$

$$\Rightarrow 2 + x = x^2 - 8x + 16 \quad (\text{Binom: } (x-4)^2)$$

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

$a = 1$
$b = -9$
$c = 14$

$$x_{1/2} = \frac{9 \pm \sqrt{25}}{2}$$

$$D = (-9)^2 - 4 \cdot 1 \cdot 14$$
$$D = 25$$

$x = 7 \vee x = 2$

Probe

$x = 7 \Rightarrow \sqrt{2+7} + 4 = 7$ (w)

$x = 2 \Rightarrow \sqrt{2+2} + 4 = 2$ (f)

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

Buch S 143 / 3d $G = \mathbb{R}$ $D = \{x \mid x \leq \frac{3}{2}\}$

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

$\Leftrightarrow -\sqrt{3-2x} = 2-3x \quad | :(-1)$

$\Leftrightarrow \sqrt{3-2x} = -2+3x \quad | ^2$

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

$\Rightarrow 3-2x = 9x^2 - 12x + 4$

$\Leftrightarrow 0 = 9x^2 - 10x + 1$

$\Leftrightarrow x_{1/2} = \frac{10 \pm \sqrt{64}}{18}$

$\Leftrightarrow x = 1 \vee x = \frac{2}{18} \left(\frac{1}{9}\right)$

Ausführliche Betrachtung der Definitionsmenge:

Bedingung

$3-2x \geq 0$ sein

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

$\Leftrightarrow x \leq \frac{3}{2}$ (Inversionsregel)

$a = 9$

$b = -10$

$c = 1$

$D = 10^2 - 4 \cdot 9 \cdot 1$

$D = 64$

Probe:

$x = 1 \Rightarrow 3 - \sqrt{3-2} = 2$

$3 - 1 = 2$ (w)

$x = \frac{1}{9} \Rightarrow 3 \cdot \frac{1}{9} - \sqrt{3 - 2 \cdot \frac{1}{9}} = 2$

$\frac{1}{3} - \sqrt{\frac{25}{9}} = 2$

$\frac{1}{3} - \frac{5}{3} = 2$ (f)

$\Rightarrow L = \{1\}$