

Musterbeispiel

Aufgabe 22

a)

$$\begin{aligned} 2x - 7 &= 3x - 2; & x \in \mathbb{N} \\ 2x - 7 &= 3x - 2 & | + 2 \\ 2x - 5 &= 3x & | - 2x \\ x &= -5 \\ L &= \{ \}, \text{ denn } -5 \in \mathbb{Z} \end{aligned}$$

b)

$$\begin{aligned} \frac{2}{3}y + 1 &= \frac{1}{3}y + \frac{5}{3}; & x \in \mathbb{Q}_+ \\ \frac{2}{3}y + 1 &= \frac{1}{3}y + \frac{5}{3} & | - 1 \\ \frac{2}{3}y &= \frac{1}{3}y + \frac{2}{3} & | - \frac{1}{3}y \\ \frac{1}{3}y &= \frac{2}{3} & | \cdot 3 \end{aligned}$$

$$y = 2$$

$$L = \{2\}$$

c)

$$\begin{aligned} y^2 + 3y - y^2 &= 0; & y \in \mathbb{N} \\ y^2 + 3y - y^2 &= 0 \\ 3y &= 0 & | : 3 \\ y &= 0 \end{aligned}$$

$$L = \{0\}$$

$$\begin{aligned} \text{d) } -2v - 3 &= -9v - 3 + 7v & | \text{Zsf} \\ -2v - 3 &= -2v - 3 & | + 3 \\ -2v &= -2v & | + 2v \end{aligned}$$

$$0 = 0$$

$$L = \mathbb{Q}$$

$$\begin{array}{lcl}
\text{e)} & 3a - 5 + a = 1; & a \in \mathbb{Q}_+ \\
& 3a - 5 + a = 1 & | \text{Zsf.} \\
& 4a - 5 = 1 & | + 5 \\
& 4a = 6 & | : 4 \\
& a = \frac{3}{2} &
\end{array}$$

$$L = \left\{ \frac{3}{2} \right\}$$

$$\begin{array}{lcl}
\text{f)} & 3x = -\frac{1}{3}x + \frac{10}{3}x + 1 & | \text{Zsf.} \\
& 3x = 3x + 1 & | - 3x \\
& 0 = 1 &
\end{array}$$

$$L = \emptyset$$

$$\begin{array}{lcl}
\text{g)} & 3x + 5 = 3 \cdot (x + 2) & | \text{Ausm.} \\
& 3x + 5 = 3x + 6 & | - 3x \\
& 5 = 6 &
\end{array}$$

$$L = \emptyset$$

$$\begin{array}{lcl}
\text{h)} & 3x + 3x + 4 = 6 \cdot \left(x + \frac{2}{3}\right) & | \text{Ausm.} + \text{Zsf.} \\
& 6x + 4 = 6x + 4 & | - 6x \\
& 4 = 4 &
\end{array}$$

$$L = \mathbb{Q}$$

$$\begin{array}{lcl}
\text{i)} & 4x = 2(2x + 3) & x \in \mathbb{Q}_+ \\
& 4x = 2(2x + 3) & | \text{Ausm.} \\
& 4x = 4x + 6 & | - 4x \\
& 0 = 6 &
\end{array}$$

$$L = \emptyset$$

$$\begin{array}{lcl}
\text{j)} & 3x + 1 = 2x + 2; & x \in \mathbb{N} \\
& 3x + 1 = 2x + 2 & | - 1 \\
& 3x = 2x + 1 & | - 2x \\
& x = 1 &
\end{array}$$

$$L = \{1\}$$