

## Mathe 7 – Lösungen – Lösen von linearen Gleichungen

$$\begin{array}{l} 1. \quad 3x+15=7 \quad | -15 \\ \quad \quad 3x=-8 \quad | :3 \\ \quad \quad \quad x=-\frac{8}{3} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } 3 \cdot \left(-\frac{8}{3}\right) + 15 = 7 \\ \quad \quad \quad -8 + 15 = 7 \\ \quad \quad \quad \underline{7=7} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{-\frac{8}{3}\right\}}} \end{array}$$

$$\begin{array}{l} 2. \quad 9-5x=6 \quad | -9 \\ \quad \quad -5x=-3 \quad | :(-5) \\ \quad \quad \quad x=\frac{3}{5} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } 9 - 5 \cdot \frac{3}{5} = 6 \\ \quad \quad \quad 9 - 3 = 6 \\ \quad \quad \quad \underline{6=6} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{\frac{3}{5}\right\}}} \end{array}$$

$$\begin{array}{l} 3. \quad 7x+8=5x+5 \quad | -8-5x \\ \quad \quad 2x=-3 \quad | :2 \\ \quad \quad \quad x=-\frac{3}{2} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } 7 \cdot \left(-\frac{3}{2}\right) + 8 = 5 \cdot \left(-\frac{3}{2}\right) + 5 \\ \quad \quad \quad -\frac{21}{2} + \frac{16}{2} = -\frac{15}{2} + \frac{10}{2} \\ \quad \quad \quad \underline{-\frac{5}{2} = -\frac{5}{2}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{-\frac{3}{2}\right\}}} \end{array}$$

$$\begin{array}{l} 4. \quad 3 \cdot (x+4) = 5 \cdot (1-x) \\ \quad \quad 3x+12=5-5x \quad | -12+5x \\ \quad \quad \quad 8x=-7 \quad | :8 \\ \quad \quad \quad \quad x=-\frac{7}{8} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } 3 \cdot \left(-\frac{7}{8} + 4\right) = 5 \cdot \left(1 + \frac{7}{8}\right) \\ \quad \quad \quad 3 \cdot \frac{25}{8} = 5 \cdot \frac{15}{8} \\ \quad \quad \quad \underline{\frac{75}{8} = \frac{75}{8}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{-\frac{7}{8}\right\}}} \end{array}$$

$$\begin{array}{l} 5. \quad -0,5 \cdot (4x-5) = 1,25 \cdot (12-8x) \\ \quad \quad -2x+2,5=15-10x \quad | -2,5+10x \\ \quad \quad \quad 8x=12,5 \quad | :8 \\ \quad \quad \quad \quad x=\frac{25}{16} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } -0,5 \cdot \left(4 \cdot \frac{25}{16} - 5\right) = 1,25 \cdot \left(12 - 8 \cdot \frac{25}{16}\right) \\ \quad \quad \quad -0,5 \cdot \frac{5}{4} = 1,25 \cdot \left(-\frac{1}{2}\right) \\ \quad \quad \quad \underline{-\frac{5}{8} = -\frac{5}{8}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{\frac{25}{16}\right\}}} \end{array}$$

$$\begin{array}{l} 6. \quad \frac{2}{3}x + \frac{5}{6} = \frac{1}{2}x - \frac{2}{3} \quad | -\frac{5}{6} - \frac{1}{2}x \\ \quad \quad \frac{1}{6}x = -\frac{3}{2} \quad | \cdot 6 \\ \quad \quad \quad x = -9 \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } \frac{2}{3} \cdot (-9) + \frac{5}{6} = \frac{1}{2} \cdot (-9) - \frac{2}{3} \\ \quad \quad \quad -\frac{36}{6} + \frac{5}{6} = -\frac{27}{6} - \frac{4}{6} \\ \quad \quad \quad \underline{-\frac{31}{6} = -\frac{31}{6}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \{-9\}}} \end{array}$$

$$\begin{array}{l} 7. \quad 2 \cdot \left(\frac{2}{3}x + \frac{5}{6}\right) = -3 \cdot \left(\frac{1}{2}x - \frac{2}{3}\right) \\ \quad \quad \frac{4}{3}x + \frac{5}{3} = -\frac{3}{2}x + 2 \quad | -\frac{5}{3} + \frac{3}{2}x \\ \quad \quad \frac{17}{6}x = \frac{1}{3} \quad | \cdot \frac{6}{17} \\ \quad \quad \quad x = \frac{2}{17} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } 2 \cdot \left(\frac{2}{3} \cdot \frac{2}{17} + \frac{5}{6}\right) = -3 \cdot \left(\frac{1}{2} \cdot \frac{2}{17} - \frac{2}{3}\right) \\ \quad \quad \quad \frac{8}{51} + \frac{5}{3} = -\frac{3}{17} + 2 \\ \quad \quad \quad \underline{-\frac{31}{17} = -\frac{31}{17}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{\frac{2}{17}\right\}}} \end{array}$$

$$\begin{array}{l} 8. \quad \frac{1}{2} \cdot \left(\frac{2}{3}x + \frac{5}{6}\right) = -\frac{3}{4} \cdot \left(\frac{1}{2}x - \frac{2}{3}\right) \\ \quad \quad \frac{1}{3}x + \frac{5}{12} = -\frac{3}{8}x + \frac{1}{2} \quad | -\frac{5}{12} + \frac{3}{8}x \\ \quad \quad \frac{17}{24}x = \frac{1}{12} \quad | \cdot \frac{24}{17} \\ \quad \quad \quad x = \frac{2}{17} \\ \quad \quad \quad \underline{\quad \quad} \end{array}$$

$$\begin{array}{l} \text{Probe: } \frac{1}{2} \cdot \left(\frac{2}{3} \cdot \frac{2}{17} + \frac{5}{6}\right) = -\frac{3}{4} \cdot \left(\frac{1}{2} \cdot \frac{2}{17} - \frac{2}{3}\right) \\ \quad \quad \quad \frac{2}{51} + \frac{5}{12} = -\frac{3}{68} + \frac{1}{2} \\ \quad \quad \quad \underline{-\frac{31}{68} = -\frac{31}{68}} \quad \text{w. A.} \rightarrow \underline{\underline{L = \left\{\frac{2}{17}\right\}}} \end{array}$$

Hinweis: Die Gleichung  $\frac{1}{2} \cdot \left(\frac{2}{3}x + \frac{5}{6}\right) = -\frac{3}{4} \cdot \left(\frac{1}{2}x - \frac{2}{3}\right)$  ist äquivalent zur Gleichung  $2 \cdot \left(\frac{2}{3}x + \frac{5}{6}\right) = -3 \cdot \left(\frac{1}{2}x - \frac{2}{3}\right)$  → gleiche Lösungsmenge ;-)

## Mathe 7 – Lösungen – Lösen von linearen Gleichungen

9.  $|x+15|=12$

I)  $x+15=12$

$x_1=-3$

II)  $x+15=-12$

$x_2=-27$

Probe:

I)  $|-3+15|=12$  w. A.

II)  $|-27+15|=12$  w. A. →  $L=\{-27;-3\}$

10.  $\left|\frac{2}{3}-3x\right|=1$

I)  $\frac{2}{3}-3x=1$

$|- \frac{2}{3}$

$-3x=\frac{1}{3}$

$|\div(-3)$

$x_1=-\frac{1}{9}$

II)  $\frac{2}{3}-3x=-1$

$|- \frac{2}{3}$

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

$|\div(-3)$

$x_2=\frac{5}{9}$

Probe:

I)  $\left|\frac{2}{3}-3\cdot\frac{1}{9}\right|=1$

$|1|=1$  w. A.

II)  $\left|\frac{2}{3}-3\cdot\frac{5}{9}\right|=1$

$|-1|=1$  w. A.

$L=\left\{-\frac{1}{9};\frac{5}{9}\right\}$