Aufgabe 8

a)

$$\begin{aligned} 39 + x &= 144 - 2x && | - x \\ 39 &= 144 - 3x && | - 144 \\ -105 &= -3x && | : (-3) \\ 35 &= x \end{aligned}$$

b)

$$\begin{aligned} 5 + 5x &= -25 - 3x && | + 3x \\ 5 + 8x &= -25 && | - 5 \\ 8x &= -30 && | : 8 \\ x &= -3{,}75 \end{aligned}$$

c)

$$\begin{aligned} 6x - 30 &= 110 - 4x && | + 4x \\ 10x - 30 &= 110 && | + 30 \\ 10x &= 140 && | : 10 \\ x &= 14 \end{aligned}$$

d)

$$\begin{aligned} 10 - x &= x - 10 && | + x \\ 10 &= 2x - 10 && | + 10 \\ 20 &= 2x && | : 2 \\ 10 &= x \end{aligned}$$

e)

$$\begin{aligned} 3 - 3x &= 3x + 1 && \mid +3x \\ 3 &= 6x + 1 && \mid -1 \\ 2 &= 6x && \mid :6 \\ \frac{1}{3} &= x \end{aligned}$$

f)

$$\begin{aligned} \frac{3}{4}x &= 38 - 4x && \mid +4x \\ 4\frac{3}{4}x &= 38 && \mid :4\frac{3}{4} \\ x &= 8 \end{aligned}$$

Alternative: Nenner zunächst eliminieren!

$$\begin{aligned} \frac{3}{4}x &= 38 - 4x && \mid \cdot 4 \\ 3x &= 152 - 16x && \mid :+16x \\ 19x &= 152 && \mid :19 \\ x &= 8 \end{aligned}$$

g)

$$\begin{aligned} \frac{1}{2}x - 4 &= x + \frac{1}{2} && \mid -\frac{1}{2}x \\ -4 &= \frac{1}{2}x + \frac{1}{2} && \mid -\frac{1}{2} \\ -4\frac{1}{2} &= \frac{1}{2}x && \mid :\frac{1}{2} \\ -9 &= x \end{aligned}$$

Alternative: Nenner zunächst eliminieren!

$$\begin{aligned} \frac{1}{2}x - 4 &= x + \frac{1}{2} && | \cdot 2 \\ x - 8 &= 2x + 1 && | - x \\ -8 &= x + 1 && | - 1 \\ -9 &= x \end{aligned}$$

h)

$$\begin{aligned} \frac{2}{3}x - \frac{1}{5} &= \frac{2}{5}x + \frac{1}{3} && | - \frac{2}{5}x \\ \frac{4}{15}x - \frac{1}{5} &= \frac{1}{3} && | + \frac{1}{5} \\ \frac{4}{15}x &= \frac{8}{15} && | \frac{4}{15} \\ x &= 2 \end{aligned}$$

Alternative: Nenner zunächst eliminieren! Wir nutzen dafür den gemeinsamen Nenner.

$$\begin{aligned} \frac{2}{3}x - \frac{1}{5} &= \frac{2}{5}x + \frac{1}{3} && | \cdot 15 \\ 10x - 3 &= 6x + 5 && | - 6x \\ 4x - 3 &= 5 && | + 3 \\ 4x &= 8 && | : 4 \\ x &= 2 \end{aligned}$$

i)

$$\begin{aligned}
\frac{x}{3}+\frac{2}{3} &= \frac{3}{4}-\frac{1}{4}x && \left|+\frac{1}{4}x\right.\\
\frac{7}{12}x+\frac{2}{3} &= \frac{3}{4} && \left|-\frac{2}{3}\right.\\
\frac{7}{12}x &= \frac{1}{12} && \left|:\frac{7}{12}\right.\\
x &= \frac{1}{7}
\end{aligned}$$

Alternative: Nenner zunächst eliminieren! Wir nutzen dafür den gemeinsamen Nenner.

$$\begin{aligned}
\frac{x}{3}+\frac{2}{3} &= \frac{3}{4}-\frac{1}{4}x && \left|\cdot 12\right.\\
4x+8 &= 9-3x && \left|+3x\right.\\
7x+8 &= 9 && \left|-8\right.\\
7x &= 1 && \left|:7\right.\\
x &= \frac{1}{7}
\end{aligned}$$