Wochenübungsblatt R6

8 - Gleichungen V

Aufgaben

1. Löse mit $\mathbb{G} = \mathbb{Q}$

   a) $2(x+3) = 6x$
   b) $4x - 12 = 2(x - 45)$
   c) $0,5(x-1) = x - 4$
   d) $x(-4+x) = x^2 + 13$
   e) $(x-1)(x+1) = x^2 - 6x$
   f) $2 \cdot 3x + 12 = x - 5$
   g) $b - 1 = 2(b-1)(2+4)$
   h) $a + a = -20$
   i) $b - b = -1$
   j) $2(\frac{1}{2} - x) + 1 = 40x$
   k) $x - 1^{30} = 1^{10} - x$
   l) $2x + 4 \cdot x = 81x + 2(1+x)$
   m) $c^2 = 4$
   n) $-3(x + \frac{2}{3}) = -4\frac{1}{3} \cdot 3$
   o) $-x \cdot -\frac{1}{3} = 3(4+x) \cdot 3$

2. Löse mit $\mathbb{G} = \mathbb{Q}$

   a) $2(x+10) + 3(1-x) = (x-16)(4-2) - (x-1)$
   b) $3(x-10) - x(x+1+2x+4) = -x^2 + 22(3-2) + 2x - 2x^2$
   c) $(2+2x)(2x-4) - 4(x^2+3x-1) = 17(2x+10) + (x+1) \cdot 3$
   d) $(-5)(-x-1) = 14(x+1) - 2(4x+1)$
   e) $x^2 + 2(4-2x) = (-x-1)(-2-x) - 16 - 1$
   f) $-1 - 3x + x - 4x + 4 + 20x = 29x - 4x - 3 + 5x - x + 78 + 100x$
   g) $3(\frac{2}{3}x - 1,5) - (x + 1\frac{2}{3} + 2x + 4\frac{2}{3}) = -\frac{x}{2} + 0,5(4-2) + 2\frac{1}{2}x$
   h) $\frac{2}{3}x \cdot 3 + 2(x-3) = -100\frac{x}{3} \cdot 3$
   i) $(2+2)(2x-4) - 4(3x-1+x) = 6(2+10) + 3(x+1)$
   j) $(2+3-1)(2+x-4) - (2+3x-1+x) = 6(1+2) + 3(x+1) - 3$

Erklärung

Vereinfache zunächst beide Seiten durch Termumformungen und löse dann wie in *Gleichungen IV*, schau aber immer *vor* aufwändigeren Umformungen, ob Du nicht *vorher* Teilaufgaben einfacher schreiben oder gar ganz ausrechnen kannst, weil sie gar keine Unbekannten enthalten!

Lösungen

1. Löse mit $\mathbb{G} = \mathbb{Q}$

   a) $2x + 6 = 6x \iff x = 1,5$
   b) $4x - 12 = 2x - 90 \iff x = -39$
   c) $0,5x - 0,5 = x - 4 \iff x = 7$
   d) $-4x + x^2 = x^2 + 13 \iff x = -3,25$
   e) $x^2 - 1 = x^2 - 6x \iff x = \frac{1}{6}$
   f) $6x + 12 = x - 5 \iff x = -3,4$
   g) $b - 1 = 12b - 12 \iff b = 1$
   h) $2a = -20 \iff a = -10$
   i) $0 = -1 \iff \mathbb{L} = \{\}$
   j) $2 - 2x = 40x \iff x = \frac{1}{21}$
   k) $x - 1 = 1 - x \iff x = 1$
   l) $6x = 83x + 2 \iff x = -\frac{2}{77}$

m) $\mathbb{L} = \{-2; +2\}$

n) $-3x - 2 = -13 \iff x = 3\frac{2}{3}$

o) $\frac{1}{3}x = 36 + 9x \iff x = -3\frac{12}{13}$

2. Löse mit $\mathbb{G} = \mathbb{Q}$

a) $$\begin{aligned} ... &\iff 2(x+10)+3(1-x) &&= 2(x-16)-(x-1) \\ &\iff -x+23 &&= x-31 \\ &\iff x &&= 27 \end{aligned}$$

b) $$\begin{aligned} ... &\iff 3(x-10)-x(3x+5) &&= -3x^2+22+2x \\ &\iff -3x^2-2x-30 &&= -3x^2+2x+22 \\ &\iff x &&= -13 \end{aligned}$$

c) $$\begin{aligned} ... &\iff (2+2x)(2x-4)-4(x^2+3x-1) &&= 17(2x+10)+3(x+1) \\ &\iff -16x-4 &&= 37x+173 \\ &\iff x &&= -3\tfrac{18}{53} \end{aligned}$$

d) $$\begin{aligned} ... &\iff 5(x+1) &&= 14(x+1)-2(4x+1) \\ &\iff 5x+5 &&= 6x+12 \\ &\iff x &&= -7 \end{aligned}$$

e) $$\begin{aligned} ... &\iff x^2+2(4-2x) &&= (x+1)(2+x)-17 \\ &\iff x^2-4x+8 &&= x^2+3x-15 \\ &\iff x &&= 3\tfrac{2}{7} \end{aligned}$$

f) $$\begin{aligned} ... &\iff 14x+3 &&= 129x+75 \\ &\iff x &&= -\tfrac{72}{115} \end{aligned}$$

g) $$\begin{aligned} ... &\iff 3(\tfrac{2}{3}x-1,5)-(3x+6\tfrac{1}{3}) &&= 1+2x \\ &\iff -x-10\tfrac{5}{6} &&= 2x+1 \\ &\iff x &&= -3\tfrac{17}{18} \end{aligned}$$

h) $$\begin{aligned} ... &\iff 2x+2(x-3) &&= -100x \\ &\iff 4x-6 &&= -100x \\ &\iff x &&= \tfrac{3}{52} \end{aligned}$$

i) $$\begin{aligned} ... &\iff 4(2x-4)-4(4x-1) &&= 72+3(x+1) \\ &\iff -8x-12 &&= 3x+75 \\ &\iff x &&= -10\tfrac{10}{11} \end{aligned}$$

j) $$\begin{aligned} ... &\iff 4(-2+x)-(1+4x) &&= 15+3(x+1) \\ &\iff -9 &&= 3x+18 \\ &\iff x &&= -9 \end{aligned}$$