

Gleichungen und Lösungsmengen

1) Löse folgende lineare Gleichungen und gib die Lösungsmengen in (i) $G = \mathbb{R}$, (ii) $G = \mathbb{Z}$ an.

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|--|--------------------|--------------------|
| a) $3 + [5y - 8 - (1 - y)] = 60 - [-2 - 3y - (8 + 7y)]$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| b) $(2m - 3) - (3m - 1) = 2 + (m + 4)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| c) $3y + 4 \cdot (y - 3) = 5y - 3 \cdot (y - 1)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| d) $3 \cdot (2x - 8) - 2 \cdot (4 - 3x) = 20x$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| e) $3 \cdot (4x - 3) - 2 \cdot (2 - x) = 4(x - 2)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| f) $(x + 2)(3x - 4) = 3x(x - 2)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| g) $(6x - 5)(4x + 3) = 3x(8x + 11)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| h) $(x - 2)^2 = (x + 2) \cdot (x - 8)$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| i) $(2x - 5)^2 - (2x + 3) \cdot (2x - 3) = 4$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| j) $(3z + 4)^2 - (3z - 8)(3z + 8) = 2z$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| k) $(4 - 3z)^2 - (5z^2 + 7) = (2z + 3)^2$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |
| l) $9 \cdot (x - 3)^2 + 4 \cdot (2x + 1)^2 = (5x - 2)^2$ | $L_{\mathbb{R}} =$ | $L_{\mathbb{Z}} =$ |

Lösungen: -19; -4; 3; -4; 1/2; 1; -3/7; -10; 3/2; -40/11; 0; 9/2

2) Löse folgende lineare Gleichungen mit Brüchen bzw. Bruchgleichungen und gib die Definitionsmenge bzw. die Lösungsmenge an.

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| a) $\frac{2(x-3)}{4} = \frac{x}{3}$ | $D =$ | $L =$ |
| b) $\frac{x-1}{5} = \frac{5(x-1)}{4}$ | $D =$ | $L =$ |
| c) $\frac{2x}{3} + \frac{3x}{4} + \frac{3x}{8} = \frac{5x}{12} + \frac{11}{2}$ | $D =$ | $L =$ |
| d) $\frac{1}{x-1} + 6 = \frac{3}{x-1}$ | $D =$ | $L =$ |
| e) $\frac{1}{1-x} = \frac{7}{2x+1}$ | $D =$ | $L =$ |
| f) $\frac{x-8}{x+16} = \frac{x+16}{x-8}$ | $D =$ | $L =$ |
| g) $\frac{5}{x(x+2)} - \frac{1}{x(x-1)} = \frac{3}{(x+2)(x-1)}$ | $D =$ | $L =$ |
| h) $\frac{2}{x^2-2x} + \frac{3}{x} = -\frac{1}{x-2}$ | $D =$ | $L =$ |
| i) $\frac{36}{x^2-9} = \frac{x}{x-3} - \frac{x}{x+3}$ | $D =$ | $L =$ |
| j) $\frac{5}{x^2-25} + \frac{1}{x^2+5x} = \frac{1}{x^2-5x}$ | $D =$ | $L =$ |

Lösungen: 9; 1; 4; 4/3; 2/3; -4; 7; 1; 6; 2