

Lineare Gleichungen 5

Lösen Sie folgende Gleichungen; führen Sie die Probe durch

1. $x(x - 3) + 5x - 7 = (x - 3)^2$
2. $3x - 14 - (6x - 4) = (x - 2)(x + 1) - x^2$
3. $5(\frac{1}{2}x - 5) + x^2 = (x - 5)(x + 5) - \frac{1}{2}x$
4. $(x + 3)^2 + (x - 3)^2 - x^2 = (x + 3)(x - 3)$
5. $(2x - 4)(3 - x) + x^2 = -(x - 4)^2$
6. $7x + 20 + x^2 = -2 + (x - 3) * 2$
7. $2x - 5 = 3x - 7$
8. $(x - 4)3x + 2 = (3x - 2)(x - 1) - 7x$
9. $(x - 2)^2x - 2 - (6x + 3) = x^2$
10. $(6x - 7)x = -6(x - 1)$

Lineare Gleichungen 5

1.

$$\begin{aligned}x(x-3) + 5x - 7 &= (x-3)^2 \\ \Leftrightarrow x^2 - 3x + 5x - 7 &= x^2 - 6x + 9 \\ \Leftrightarrow x^2 + 2x - 7 &= x^2 - 6x + 9 \quad | -x^2 \\ \Leftrightarrow 2x - 7 &= -6x + 9 \quad | +6x \\ \Leftrightarrow 8x - 7 &= 9 \quad | +7 \\ \Leftrightarrow 8x &= 16 \quad | :8 \\ \Leftrightarrow x &= 2\end{aligned}$$

$$\begin{aligned}\text{Probe: } 2 * (2 - 3) + 5 * 2 - 7 &= (2 - 3)^2 \\ \Leftrightarrow 2 * (-1) + 10 - 7 &= (-1)^2 \\ \Leftrightarrow -2 + 10 - 7 &= 1 \\ \Leftrightarrow 1 &= 1\end{aligned}$$

2.

$$\begin{aligned}3x - 14 - (6x - 4) &= (x - 2)(x + 1) - x^2 \\ \Leftrightarrow 3x - 14 - 6x + 4 &= x^2 - 2x + x - 2 - x^2 \\ \Leftrightarrow -3x - 10 &= -x - 2 \quad | +3x \\ \Leftrightarrow -10 &= 2x - 2 \quad | +2 \\ \Leftrightarrow -8 &= 2x \quad | :2 \\ \Leftrightarrow x &= -4 \quad | :8\end{aligned}$$

$$\begin{aligned}\text{Probe: } 3 * (-4) - 14 - (6 * (-4) - 4) &= (-4 - 2) * (-4 + 1) - (-4)^2 \\ \Leftrightarrow -12 - 14 - (-24 - 4) &= -6 * (-3) - 16 \\ \Leftrightarrow -26 + 28 &= 18 - 16 \\ \Leftrightarrow 2 &= 2\end{aligned}$$

3.

$$\begin{aligned}5\left(\frac{1}{2}x - 5\right) + x^2 &= (x - 5)(x + 5) - \frac{1}{2}x \\ \Leftrightarrow 2,5x - 25 + x^2 &= x^2 - 25 - 0,5x \quad | -x^2 + 25 \\ \Leftrightarrow 2,5x &= -0,5x \quad | +0,5x \\ \Leftrightarrow 3x &= 0 \quad | :3 \\ \Leftrightarrow x &= 0\end{aligned}$$

$$\begin{aligned}\text{Probe: } 5 * (0,5 * 0 - 5) + 0^2 &= (0 - 5) * (0 + 5) - 0,5 * 0 \\ \Leftrightarrow 5 * (-5) &= -5 * 5 \\ \Leftrightarrow -25 &= -25\end{aligned}$$

Lineare Gleichungen 5

4.

$$\begin{aligned}(x+3)^2 + (x-3)^2 - x^2 &= (x+3)(x-3) \\ \Leftrightarrow x^2 + 6x + 9 + x^2 - 6x + 9 - x^2 &= x^2 - 9 \\ \Leftrightarrow x^2 + 18 &= x^2 - 9 && | -x^2 \\ \Leftrightarrow 18 &= -9 && | : 3\end{aligned}$$

keine Lösung

5.

$$\begin{aligned}(2x-4)(3-x) + x^2 &= -(x-4)^2 \\ \Leftrightarrow 6x - 2x^2 - 12 + 4x + x^2 &= -(x^2 - 8x + 16) \\ \Leftrightarrow -x^2 + 10x - 12 &= -x^2 + 8x - 16 && | +x^2 \\ \Leftrightarrow 10x - 12 &= 8x - 16 && | -8x \\ \Leftrightarrow 2x - 12 &= -16 && | +12 \\ \Leftrightarrow 2x &= -4 && | : 2 \\ \Leftrightarrow x &= -2 \\ \text{Probe: } (2 * (-2) - 4) * (3 - (-2)) + (-2)^2 &= -(-2 - 4)^2 \\ \Leftrightarrow -8 * 5 + 4 &= -(-6)^2 \\ \Leftrightarrow -36 &= -36\end{aligned}$$

6.

$$\begin{aligned}7x + 20 + x^2 &= -2 + (x-3) * 2 \\ \Leftrightarrow 7x + 20 + x^2 &= -2 + x^2 - 6x + 9 && | -x^2 \\ \Leftrightarrow 7x + 20 &= -6x + 7 && | +6x \\ \Leftrightarrow 13x + 20 &= 7 && | -20 \\ \Leftrightarrow 13x &= -13 && | : 13 \\ \Leftrightarrow x &= -1 \\ \text{Probe: } 7 * (-1) + 20 + (-1)^2 &= -2 + (-1 - 3)^2 \\ \Leftrightarrow -7 + 20 + 1 &= -2 + (-4)^2 \\ \Leftrightarrow 14 &= -2 + 16 = 14\end{aligned}$$

7.

$$\begin{aligned}2x - 5 &= 3x - 7 && | -2x \\ \Leftrightarrow -5 &= x - 7 && | +7 \\ \Leftrightarrow 2 &= x \\ \text{Probe: } 2 * 2 - 5 &= 2 * 2 - 7 \\ \Leftrightarrow -1 &= -1\end{aligned}$$

Lineare Gleichungen 5

8.

$$\begin{aligned}(x-4)3x+2 &= (3x-2)(x-1)-7x \\ \Leftrightarrow 3x^2-12x+2 &= 3x^2-3x-2x+2-7x && | -3x^2-2 \\ \Leftrightarrow -12x &= -12x\end{aligned}$$

unendlich viele Lösungen

9.

$$\begin{aligned}(x-2)^2-2-(6x+3) &= x^2 \\ \Leftrightarrow x^2-4x+4-2-6x-3 &= x^2 && | -x^2 \\ \Leftrightarrow -10x-1 &= 0 && | +1 \\ \Leftrightarrow -10x &= 1 && | (: -10) \\ \Leftrightarrow x &= -0,1 \\ \text{Probe: } (-0,1-2)^2-2-(6*(-0,1)+3) &= (-0,1)^2 \\ \Leftrightarrow (-2,1)^2-2-(-0,6+3) &= 0,01 \\ \Leftrightarrow 4,41-2-2,4 &= 0,01 \\ \Leftrightarrow 0,01 &= 0,01\end{aligned}$$

10.

$$\begin{aligned}(6x-7)x &= -6x(1-x) \\ \Leftrightarrow 6x^2-7x &= -6x+6x^2 && | -6x^2 \\ \Leftrightarrow -7x &= -6x && | +6x \\ \Leftrightarrow -x &= 0 && | : (-1) \\ \Leftrightarrow x &= 0 \\ \text{Probe: } (6*0-7)*0 &= -6*0(1-0) \\ \Leftrightarrow -7*0 &= -6*0 \\ \Leftrightarrow 0 &= 0\end{aligned}$$