

Aufgaben Training quadratische Gleichungen I

Lösen Sie die quadratischen Gleichungen mit den ihnen bekannten Verfahren.	
1. $4x^2 = 1$	2. $x^2 + 4x = 0$
3. $2x^2 - 16x + 14 = 0$	4. $(x + 2)^2 = 16$
5. $4x^2 - 16 = 0$	6. $x^2 - 8x + 7 = 0$
7. $x^2 + \pi x = 0$	8. $2(x + 3)^2 - 18 = 0$
9. $-x^2 + x = -\frac{1}{2}$	10. $3x^2 + 12x + 3 = 0$
11. $-x^2 + 8x - 8 = 0$	12. $4(x - 4)^2 = 32$
13. $\frac{1}{12}x^2 - x = 0$	14. $\frac{1}{4}x^2 + 2x - \frac{2}{5} = 0$
15. $\frac{3}{16}x^2 - \frac{3}{4}x = 0$	16. $-\frac{3}{4}x^2 + 3x + 9 = 0$
17. $\frac{3}{2}x^2 - x - 4 = 0$	18. $\frac{3}{4}x^2 - \frac{1}{3}x = 0$
19. $2x^2 - \frac{10}{3}x - \frac{4}{3} = 0$	20. $\frac{2}{3}x^2 + 4x = 0$

Beispiel 1:

$$8x^2 = 2 | :8 \Leftrightarrow x^2 = \frac{1}{4} | \sqrt{\quad} \Leftrightarrow |x| = \frac{1}{2} \Leftrightarrow x_{1/2} = \pm \frac{1}{2}$$

$$\text{Probe: } x_1 = \frac{1}{2} \Rightarrow 8 \cdot \left(\frac{1}{2}\right)^2 = 8 \cdot \frac{1}{4} = 2 \quad x_2 = -\frac{1}{2} \Rightarrow 8 \cdot \left(-\frac{1}{2}\right)^2 = 8 \cdot \frac{1}{4} = 2$$

Beispiel 2:

$$2x^2 + 8x = 0 \Leftrightarrow x(2x + 8) = 0 \Leftrightarrow x_1 = 0 \text{ (Satz vom Nullprodukt)}$$

$$2x + 8 = 0 | -8 \Leftrightarrow 2x = -8 | :2 \Leftrightarrow x_2 = -4$$

$$\text{Probe: } x_1 = 0 \Rightarrow 2 \cdot 0 + 8 \cdot 0 = 0 \quad x_2 = -4 \Rightarrow 2 \cdot (-4)^2 + 8 \cdot (-4) = 2 \cdot 16 - 32 = 0$$

Beispiel 3:

$$4x^2 - 32x + 28 = 0 | :4 \Leftrightarrow x^2 - 8x + 7 = 0$$

$$\Rightarrow p = -8 \quad q = 7 \quad D = \left(\frac{p}{2}\right)^2 - q = 16 - 7 = 9 \Rightarrow \sqrt{D} = \sqrt{9} = 3$$

$$x_{1/2} = -\frac{p}{2} \pm \sqrt{D} \quad \left. \begin{array}{l} x_1 = 4 + 3 = 7 \\ x_2 = 4 - 3 = 1 \end{array} \right\} \text{Probe: } \begin{array}{l} 4 \cdot 49 - 32 \cdot 7 + 28 = 0 \\ 4 \cdot 1 - 32 \cdot 1 + 28 = 0 \end{array}$$

Beispiel 4:

$$2(x + 2)^2 = 32 | :2 \Leftrightarrow (x + 2)^2 = 16 | \sqrt{\quad} \Leftrightarrow |x + 2| = 4$$

$$\Leftrightarrow \begin{array}{l} x + 2 = 4 \Leftrightarrow x_1 = 2 \\ x + 2 = -4 \Leftrightarrow x_2 = -6 \end{array} \quad \text{Probe: } \begin{array}{l} 2(2 + 2)^2 = 2 \cdot 16 = 32 \\ 2(-6 + 2)^2 = 2 \cdot 16 = 32 \end{array}$$