

## Aufgaben zu den quadratischen Gleichungen

1.0 Lösen Sie die folgenden Gleichungen durch Ausklammern.

1.1  $3x^2 - 6x = 0$

1.2  $x^2 - \frac{1}{3}x = 0$

1.3  $\frac{3}{2}x^2 + \frac{5}{3}x = 0$

1.4  $\frac{n}{p}x^2 + \frac{a}{b}x = 0$

1.5  $6ax^2 + 10bx = 0$

1.6  $6x^2 = \frac{2x}{5}$

1.7  $(5x-1)(5x+1) - 10(x-1) = 9$

1.8  $(x-4)^2 - (3x+2)(x-4) = 24$

2.0 Zerlegen Sie die quadratischen Gleichungen zunächst in Faktoren und bestimmen Sie dann die Lösungsmenge.

2.1  $x^2 + 6x = 27$

2.2  $14x = x^2 - 51$

2.3  $x^2 - \frac{2}{3}x - \frac{8}{9} = 0$

2.4  $(x-4)(x+2) = 16$

2.5  $(x-4)(x-7) = -2$

2.6  $(x+7)^2 = 1$

3.0 Ermitteln Sie die Lösungsmenge der folgenden Gleichungen durch Substitution.

3.1  $x^4 - 8x^2 - 9 = 0$

3.2  $2x^4 + x^2 - 10 = 0$

3.3  $36x^4 - 13x^2 + 1 = 0$

4.0 Lösen Sie folgende quadratische Gleichungen mit einem Lösungsverfahren ihrer Wahl.

4.1  $x^2 - 4x + 4 = 49$

4.2  $x^2 - 10x + 25 = 1$

4.3  $x^2 + 6x + 9 = 0$

4.4  $2x^2 = 7x + 4$

4.5  $12x^2 + 15 = 29x$

4.6  $9x^2 - 3x = 2$

4.7  $x^2 + \frac{1}{5}x = \frac{4}{5}$

4.8  $x^2 - \frac{1}{4}x = \frac{1}{8}$

4.9  $x^2 - 4\sqrt{2}x + 4 = 0$

4.10  $x^2 + \sqrt{8}x + 1 = 0$

4.11  $2x^2 + 3\sqrt{2}x + 2 = 0$

4.12  $x^2 + 4 = 3\sqrt{2}x$

4.13  $(x^2 + 4)^2 - 25(x^2 + 4) + 100 = 0$

4.14  $2\left(x + \frac{1}{x}\right)^2 - 7\left(x + \frac{1}{x}\right) + 5 = 0$  (Substitution)

4.15  $(3x-2)^2 = 8(x+1)^2 - 100$

4.16  $(4-x)(3x-7) - (x+2)^2 = x$

4.17  $23(2x-1)^2 - 8(3x-2)^2 = 5(2x+1)(2x-1)$

4.18  $2(x-\sqrt{2})^2 + (x+2\sqrt{2})^2 - 5(x+\sqrt{2})(x-\sqrt{2}) = 0$

4.19  $(2x-\sqrt{2})^2 + (x+2\sqrt{2})^2 - 3(x-\sqrt{2})(x+2\sqrt{2}) = 20$

## Lösungen

$$1.1 \quad IL = \{0; 2\}$$

$$1.2 \quad IL = \left\{0; \frac{1}{3}\right\}$$

$$1.3 \quad IL = \left\{-\frac{10}{9}; 0\right\}$$

$$1.4 \quad IL = \left\{-\frac{ap}{nb}; 0\right\}$$

$$1.5 \quad IL = \left\{-\frac{5b}{3a}; 0\right\}$$

$$1.6 \quad IL = \left\{\frac{1}{15}; 0\right\}$$

$$1.7 \quad IL = \left\{0; \frac{2}{5}\right\}$$

$$1.8 \quad IL = \{0; 1\}$$

$$2.1 \quad IL = \{-9; 3\}$$

$$2.2 \quad IL = \{-3; 17\}$$

$$2.3 \quad IL = \left\{-\frac{2}{3}; \frac{4}{3}\right\}$$

$$2.4 \quad IL = \{-4; 6\}$$

$$2.5 \quad IL = \{5; 6\}$$

$$2.6 \quad IL = \{-6; -8\}$$

$$3.1 \quad IL = \{-3; 3\}$$

$$3.2 \quad IL = \{-\sqrt{2}; \sqrt{2}\}$$

$$3.3 \quad IL = \left\{-\frac{1}{2}; -\frac{1}{3}; \frac{1}{3}; \frac{1}{2}\right\}$$

$$4.1 \quad IL = \{-5; 9\}$$

$$4.2 \quad IL = \{4; 6\}$$

$$4.3 \quad IL = \{-3\}$$

$$4.4 \quad IL = \left\{-\frac{1}{2}; 4\right\}$$

$$4.5 \quad IL = \left\{\frac{3}{4}; \frac{5}{3}\right\}$$

$$4.6 \quad IL = \left\{-\frac{1}{3}; \frac{2}{3}\right\}$$

$$4.7 \quad IL = \left\{-1; \frac{4}{5}\right\}$$

$$4.8 \quad IL = \left\{-\frac{1}{4}; \frac{1}{2}\right\}$$

$$4.9 \quad IL = \{2\sqrt{2} - 2; 2\sqrt{2} + 2\}$$

$$4.10 \quad IL = \{-\sqrt{2} - 1; -\sqrt{2} + 1\}$$

$$4.11 \quad IL = \left\{-\sqrt{2}; -\frac{1}{2}\sqrt{2}\right\}$$

$$4.12 \quad IL = \{\sqrt{2}; 2\sqrt{2}\}$$

$$4.13 \quad IL = \{-4; -1; 1; 4\}$$

$$4.14 \quad IL = \left\{\frac{1}{2}; 2\right\}$$

$$4.15 \quad IL = \{4; 24\}$$

$$4.16 \quad IL = \{ \}$$

$$4.17 \quad IL = \{1\}$$

$$4.18 \quad IL = \{-\sqrt{11}; \sqrt{11}\}$$

$$4.19 \quad IL = \left\{\frac{1}{2}\sqrt{2}; \sqrt{2}\right\}$$