

① Bestimme jeweils die Lösungsmenge der Gleichung (Grundmenge \mathbb{R}).

- | | | |
|---------------------------------------|--------------------------------------|---------------------------------------|
| a) $x^2 - 4x + 4 = 49$ | b) $x^2 - 10x + 25 = 1$ | c) $x^2 + 6x + 9 = 0$ |
| d) $x^2 - 14x + 48 = 0$ | e) $x^2 - 2x = 1$ | f) $x^2 - 6x + 7 = 0$ |
| g) $x^2 + 23x + 132 = 0$ | h) $x^2 - 12x + 60 = 20$ | i) $2x^2 - 5x + 2 = 0$ |
| j) $3x^2 - 5x + 2 = 0$ | k) $2x^2 - 6x + 5 = 0$ | l) $2x^2 = 7x + 4$ |
| m) $3x^2 + 20 = 19x$ | n) $3x^2 + 4 = 6x$ | o) $9x^2 + 12x + 4 = 0$ |
| p) $12x^2 + 29x + 15 = 0$ | q) $9x^2 - 3x = 2$ | r) $x^2 + 0,2x = 0,8$ |
| s) $x^2 - \frac{1}{4}x = \frac{1}{8}$ | t) $x^2 - 4\sqrt{2} \cdot x + 4 = 0$ | u) $x^2 - 2\sqrt{3} \cdot x + 3 = 0$ |
| v) $x^2 + \sqrt{8} \cdot x + 1 = 0$ | w) $x^2 - 2\sqrt{2} \cdot x - 1 = 0$ | x) $2x^2 + 3\sqrt{2} \cdot x + 2 = 0$ |
| y) $x^2 + 4 = 3\sqrt{2} \cdot x$ | z) $x^2 + 99,9x - 10 = 0$ | |

② ...und weiter geht's:

- | | | |
|--------------------------------------------|-------------------------------|--------------------------------------------|
| a) $x^2 - 199,8x - 40 = 0$ | b) $x^2 + 22,5x - 62,5 = 0$ | c) $x^2 - 29,7x - 108,9 = 0$ |
| d) $x^2 + 111x - 24642 = 0$ | e) $2x^2 + 3x = 2$ | f) $2 + 9x + 4x^2 = 0$ |
| g) $8x^2 - 1 = 2x$ | h) $x^2 + x = 1$ | i) $4x = x^2 + 1$ |
| j) $2x^2 = 4x + 7$ | k) $4x^2 - 4x + 1 = 0$ | l) $3 + 2x + x^2 = 0$ |
| m) $3x + 4 = x^2$ | n) $4x^2 + 5 = 8x$ | o) $3x^2 + 8x = 0$ |
| p) $2x^2 = x$ | q) $4x^2 = 49$ | r) $7x^2 - 3x = 0$ |
| s) $\frac{3}{7}x^2 + \frac{1}{7} = 2$ | t) $x^2 = 5 - \frac{4}{3}x$ | u) $5x^2 - \frac{7}{4}x - \frac{3}{2} = 0$ |
| v) $5x^2 + \frac{7}{4}x - \frac{3}{2} = 0$ | w) $x \cdot (x - 4) + 96 = 0$ | x) $x \cdot (x - 4) - 37 = 0$ |
| y) $1 + 10x + 16x^2 = 0$ | z) $x^2 + 100x + 2331 = 0$ | |

③ ...und die dritte Runde:

- | | | |
|------------------------------------------------|---------------------------------------|--------------------------------------|
| a) $x^2 + 6x = 391$ | b) $x^2 + 100x - 2829 = 0$ | c) $7x^2 - 340x = 147$ |
| d) $13x^2 - 1010x - 312 = 0$ | e) $13x^2 + 95x + 172 = 0$ | f) $169x^2 - 182x + 49 = 0$ |
| g) $2x^2 - 12,5 = 0$ | h) $x^2 + 8,25x = 2,125$ | i) $4x + 7 = 16x + 4x^2$ |
| j) $2x^2 + 6x + 11 = 5x^2 - 2x$ | k) $4x^2 - 12x + 15 = 53 - 28x$ | l) $x \cdot (x - 1) = 6,75$ |
| m) $x^2 - 8\sqrt{3} \cdot x + 45 = 0$ | n) $x^2 + 2\sqrt{2} \cdot x - 6 = 0$ | o) $1 + 2\sqrt{2}x - x^2$ |
| p) $x^2 - 4\sqrt{5} \cdot x + 20 = 0$ | q) $48 - 8\sqrt{3} \cdot x + x^2 = 0$ | r) $\sqrt{3}x^2 + 2x + \sqrt{3} = 0$ |
| s) $\frac{1}{3}x^2 - \sqrt{3} \cdot x + 2 = 0$ | t) $4x^2 + 9\sqrt{2} \cdot x - 5 = 0$ | u) $x^2 + 4\sqrt{2} \cdot x = 8$ |
| v) $\sqrt{5} \cdot x^2 - 10x = 4\sqrt{5}$ | w) $x^2 + 2\sqrt{2} \cdot x - 7 = 0$ | x) $x^2 = 6 - 2\sqrt{3} \cdot x$ |
| y) $x^2 - 4x + 1 = 2\sqrt{2}$ | z) $x^2 + x = \sqrt{3} \cdot (x + 1)$ | |

④ Löse mithilfe einer geeigneten Substitution:

- | | | |
|--------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------|
| a) $x^4 - 8x^2 - 9 = 0$ | b) $x^4 - 5x^2 = 36$ | c) $32 + 12x^2 + x^4 = 0$ |
| d) $4x^4 - 1 = 0$ | e) $x^4 = 5x^2$ | f) $x^4 + 6x^2 + 6 = 0$ |
| g) $x^4 - 3,25x^2 + 2,25$ | h) $6 - 5x^2 + x^4 = 0$ | i) $2x^4 + x^2 = 1$ |
| j) $10 - 2x^4 = x^2$ | k) $36x^4 - 13x^2 + 1 = 0$ | l) $36x^4 + 36 = 97x^2$ |
| m) $x^6 - 7x^3 - 8 = 0$ | n) $x^6 - 35x^3 + 216 = 0$ | o) $x^8 - 17x^4 + 16 = 0$ |
| p) $x - 10 \cdot \sqrt{x} + 21 = 0$ | q) $x - 11 \cdot \sqrt{x} + 28 = 0$ | r) $x - \sqrt{x} = 0$ |
| s) $x^4 - 6x^2 + 1 = 0$ | t) $x^4 - 14x^2 + 1 = 0$ | |
| u) $(x - 3)^2 - 13 \cdot (x - 3) - 48 = 0$ | v) $(x^2 + 4)^2 - 25 \cdot (x^2 + 4) + 100 = 0$ | |
| w) $(x^2 + 4)^2 - 12 \cdot (x^2 + 4) + 36 = 0$ | x) $(x^2 - 4)^2 + 5 \cdot (x^2 - 4) = 0$ | |
| y) $2 \cdot \left(x + \frac{1}{x}\right)^2 - 7 \cdot \left(x + \frac{1}{x}\right) + 5 = 0$ | z) $(x - 1) + 3 \cdot \sqrt{x - 1} - 4 = 0$ | |

⑤ Karneval der Gleichungen:

- | | | |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------|
| a) $(3x - 2)^2 = 8 \cdot (x + 1)^2 - 100$ | b) $4 - x(3x - 7) - (x + 2)^2 = x$ | |
| c) $(x + 1)(x + 2)(x + 3) - (x - 7)(x - 8)(x - 9) = 360$ | | |
| d) $(x + 3)^3 - (x - 4)^3 = 721$ | e) $(2x - 1)^3 + (x - 2)^3 - 9(x - 1)^3 = 0$ | |
| f) $(x + \sqrt{5} - \sqrt{2}) \cdot (x - \sqrt{5} + \sqrt{2}) = 2 \cdot \sqrt{10}$ | g) $4 \cdot (x - \sqrt{2})^2 - (2x - \sqrt{2})^2 = 4\sqrt{2}$ | |
| h) $(2x - \sqrt{2})^2 + (x + 2\sqrt{2})^2 - 3(x - \sqrt{2}) \cdot (x + 2\sqrt{2}) = 20$ | | |
| i) $\frac{5x+4}{x+2} - \frac{6-7x}{x-2} - 9 = \frac{3x^2+5x+4}{x^2-4}$ | j) $\frac{x+4}{x-2} + \frac{x-2}{x+4} - 2 = 0$ | |
| k) $\frac{x-2}{2x+2} - \frac{x+1}{x-2} + 5 = 0$ | l) $\frac{1}{x-1} + \frac{1}{x-4} = \frac{5}{4}$ | |
| m) $\frac{3}{x+2\sqrt{2}} - 2\sqrt{2} = \frac{3}{x-2\sqrt{2}}$ | n) $\frac{6}{x+1} - \frac{2x}{x-1} + \frac{2x}{x+2} = 0$ | |
| o) $\sqrt{x-4} = 9$ | p) $1 + \sqrt{3x-5} = x$ | q) $2x = \sqrt{19x-12}$ |
| r) $\sqrt{x+3} = x+3$ | s) $3\sqrt{x+3} = x+3$ | t) $\sqrt{5+2x} = x+1$ |
| u) $x+1 + \sqrt{2x+5} = 0$ | v) $3x-5 - \sqrt{9x^2-5} = 0$ | w) $-4 + \sqrt{40-x^2} = x$ |
| x) $3\sqrt{2x^2-7} = 5\sqrt{x^2-7}$ | y) $x-1 = \sqrt{3-2x}$ | z) $\sqrt{38 + \sqrt{9x+13}} = 7$ |