

Rechenwege zum Domino „Quadratische Gleichungen“

Lösungswort: Gasthaus

$$\text{a) } x^2 - \frac{1}{3}x - \frac{5}{4} = -\frac{5}{4}$$

$$x^2 - \frac{1}{3}x - \frac{5}{4} = -\frac{5}{4} \quad | \cdot 12$$

$$12x^2 - 4x - 15 = -15 \quad | + 15$$

$$12x^2 - 4x = 0$$

$$x(12x - 4) = 0$$

$$\Rightarrow x_1 = 0 \text{ oder } 12x - 4 = 0$$

$$12x - 4 = 0 \quad | + 4$$

$$12x = 4 \quad | \div 12$$

$$x_2 = \frac{1}{3}$$

$$\Rightarrow L = \left\{ 0; \frac{1}{3} \right\}$$

$$\text{b) } -x^2 + \frac{16}{9} = -1$$

$$-x^2 + \frac{16}{9} = -1 \quad | \cdot 9$$

$$-9x^2 + 16 = -9 \quad | - 16$$

$$-9x^2 = -25 \quad | \div (-9)$$

$$x^2 = \frac{25}{9} \quad | \sqrt{\quad}$$

$$x_{1,2} = \pm \sqrt{\frac{25}{9}}$$

$$x_1 = \frac{5}{3}$$

$$x_2 = -\frac{5}{3}$$

$$\Rightarrow L = \left\{ \frac{5}{3}; -\frac{5}{3} \right\}$$

$$\text{c) } -\frac{3}{2}x^2 - 4x - \frac{5}{3} = 1$$

$$-\frac{3}{2}x^2 - 4x - \frac{5}{3} = 1 \quad | \cdot 6$$

$$-9x^2 - 24x - 10 = 6 \quad | -6$$

$$-9x^2 - 24x - 16 = 0$$

Setze $a=-9$, $b=-24$, $c=-16$ in die Lösungsformel ein:

$$x_{1,2} = \frac{24 \pm \sqrt{(-24)^2 - 4 \cdot (-9) \cdot (-16)}}{2 \cdot (-9)}$$

$$= \frac{24 \pm \sqrt{576 - 576}}{-18}$$

$$= \frac{24 \pm \sqrt{0}}{-18}$$

$$= \frac{24 \pm 0}{-18}$$

$$x_1 = -\frac{4}{3}$$

$$x_2 = -\frac{4}{3}$$

$$\Rightarrow L = \left\{ -\frac{4}{3} \right\}$$

$$\text{d) } -\frac{5}{3}x^2 + \frac{5}{3}x - 1 = -1$$

$$-\frac{5}{3}x^2 + \frac{5}{3}x - 1 = -1 \quad | \cdot 3$$

$$-5x^2 + 5x - 3 = -3 \quad | +3$$

$$-5x^2 + 5x = 0$$

$$x(-5x + 5) = 0$$

$$\Rightarrow x_1 = 0 \quad \text{oder} \quad -5x + 5 = 0$$

$$-5x + 5 = 0 \quad | -5$$

$$-5x = -5 \quad | \div (-5)$$

$$x_2 = 1$$

$$\Rightarrow L = \{0; 1\}$$

$$e) \quad -x^2 + \frac{11}{12}x - \frac{5}{12} = -\frac{4}{3}x^2 + x$$

$$-x^2 + \frac{11}{12}x - \frac{5}{12} = -\frac{4}{3}x^2 + x \quad | \cdot 12$$

$$-12x^2 + 11x - 5 = -16x^2 + 12x \quad | +16x^2 - 12x$$

$$4x^2 - x - 5 = 0$$

Setze $a=4$, $b=-1$, $c=-5$ in die Lösungsformel ein:

$$x_{1,2} = \frac{1 \pm \sqrt{(-1)^2 - 4 \cdot 4 \cdot (-5)}}{2 \cdot 4}$$

$$= \frac{1 \pm \sqrt{1+80}}{8}$$

$$= \frac{1 \pm \sqrt{81}}{8}$$

$$= \frac{1 \pm 9}{8}$$

$$x_1 = \frac{5}{4}$$

$$x_2 = -1$$

$$\Rightarrow L = \left\{ \frac{5}{4}; -1 \right\}$$

$$f) \quad \frac{7}{2}x^2 - x - \frac{17}{3} = 2x^2 - x + \frac{1}{3}$$

$$\frac{7}{2}x^2 - x - \frac{17}{3} = 2x^2 - x + \frac{1}{3} \quad | \cdot 6$$

$$21x^2 - 6x - 34 = 12x^2 - 6x + 2 \quad | -12x^2 + 6x - 2$$

$$9x^2 - 36 = 0 \quad | +34$$

$$9x^2 = 36 \quad | \div 9$$

$$x^2 = 4 \quad | \sqrt{\quad}$$

$$x_{1,2} = \pm\sqrt{4}$$

$$x_1 = 2$$

$$x_2 = -2$$

$$\Rightarrow L = \{2; -2\}$$

$$\text{g) } \frac{5}{3}x^2 + 2x + \frac{1}{2} = x^2 + 2x - \frac{1}{2}$$

$$\frac{5}{3}x^2 + 2x + \frac{1}{2} = x^2 + 2x - \frac{1}{2} \quad | \cdot 6$$

$$10x^2 + 12x + 3 = 6x^2 + 12x - 3 \quad | -6x^2 - 12x + 3$$

$$4x^2 + 6 = 0 \quad | -3$$

$$4x^2 = -6 \quad | \div 4$$

$$x^2 = -\frac{3}{2} \quad | \sqrt{\quad}$$

$$x_{1,2} = \pm \sqrt{-\frac{3}{2}}$$

$\sqrt{-\frac{3}{2}}$ hat keine Lösung \Rightarrow Die Lösungsmenge ist leer