

### 3. Stegreifaufgabe aus der Mathematik

Klasse 9

## - Lösungen -

1. a)

$$\begin{aligned}
 6x - x^2 - 9 &= 0 \\
 -x^2 + 6x - 9 &= 0 \\
 -(x^2 - 6x + 9) &= 0 \\
 -(x^2 - 6x + 3^2 - 3^2 + 9) &= 0 \\
 -(x - 3)^2 &= 0 \\
 x &= 3 \\
 \underline{\underline{L = \{3\}}}
 \end{aligned}$$

b)

$$\begin{aligned}
 5x - 3x^2 &= 0 \\
 -3x^2 + 5x &= 0 \\
 -3\left(x^2 - \frac{5}{3}x\right) &= 0 \\
 -3\left(x^2 - \frac{5}{3}x + \left(\frac{5}{6}\right)^2 - \left(\frac{5}{6}\right)^2\right) &= 0 \\
 -3\left[\left(x - \frac{5}{6}\right)^2 - \frac{25}{36}\right] &= 0 \\
 -3\left(x - \frac{5}{6}\right)^2 + \frac{25}{12} &= 0 \\
 \left(x - \frac{5}{6}\right)^2 &= \frac{25}{36} \quad | \sqrt{\phantom{x}} \\
 \left|x - \frac{5}{6}\right| &= \frac{5}{6} \\
 \underline{\underline{x_1 = 0; \quad x_2 = \frac{5}{3}}} \\
 \underline{\underline{L = \left\{0; \frac{5}{3}\right\}}}
 \end{aligned}$$

c)

$$\begin{aligned}
 4x^2 - \frac{2}{3}x &= \frac{4}{3} \\
 4x^2 - \frac{2}{3}x - \frac{4}{3} &= 0 \quad | :4 \\
 x^2 - \frac{1}{6}x - \frac{1}{3} &= 0 \\
 x^2 - \frac{1}{6}x + \left(\frac{1}{12}\right)^2 - \left(\frac{1}{12}\right)^2 - \frac{1}{3} &= 0 \\
 \left(x - \frac{1}{12}\right)^2 - \frac{49}{144} &= 0 \\
 \left(x - \frac{1}{12}\right)^2 &= \frac{49}{144} \quad | \sqrt{\phantom{x}} \\
 \left|x - \frac{1}{12}\right| &= \frac{7}{12} \\
 \underline{\underline{x_1 = \frac{2}{3}; \quad x_2 = -\frac{1}{2}}} \\
 \underline{\underline{L = \left\{-\frac{1}{2}; \frac{2}{3}\right\}}}
 \end{aligned}$$

## - Lösungen -

2. a)

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

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

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

$$x_{1/2} = \frac{24 \pm \sqrt{576 + 324}}{-18}$$

$$x_{1/2} = \frac{24 \pm 30}{-18}$$

$$\underline{x_1 = -3; \quad x_2 = \frac{1}{3}}$$

$$\underline{\underline{L = \left\{ -3; \frac{1}{3} \right\}}}$$

b)

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

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

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_{1/2} = \frac{-\frac{1}{3} \pm \sqrt{\frac{1}{9} - 4 \cdot 2 \cdot \left(-\frac{2}{3}\right)}}{2 \cdot 2}$$

$$x_{1/2} = \frac{-\frac{1}{3} \pm \sqrt{\frac{1}{9} + \frac{16}{3}}}{4}$$

$$x_{1/2} = \frac{-\frac{1}{3} \pm \sqrt{\frac{49}{9}}}{4}$$

$$x_{1/2} = \frac{-\frac{1}{3} \pm \frac{7}{3}}{4}$$

$$\underline{x_1 = -\frac{2}{3}; \quad x_2 = \frac{1}{2}}$$

$$\underline{\underline{L = \left\{ -\frac{2}{3}; \frac{1}{2} \right\}}}$$