

# Lösen von Gleichungen

## Aufgaben

51. a)  $2x - 7 - 3x = 5(3 - 2x) - 4$

$$2x - 7 - 3x = 15 - 10x - 4$$

$$-1x - 7 = 11 - 10x \quad | +10x$$

$$9x - 7 = 11 \quad | +7$$

$$9x = 18 \quad | :9$$

$$\underline{x = 2}$$

b)  $1,3(0,4x + 3) = 2,2 - (x - 1,7)$

$$0,52x + 3,9 = -2,2x + 3,74 \quad | +2,2x$$

$$2,72x + 3,9 = 3,74 \quad | -3,9$$

$$2,72x = -0,16 \quad | :2,72$$

$$\underline{x = -0,06}$$

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

$$\frac{3}{2}x - \frac{12}{5} + \frac{2}{3}x = 2x - \frac{15}{4}$$

$$\frac{13}{6}x - \frac{12}{5} = 2x - \frac{15}{4} \quad | -2x$$

$$\frac{25}{6}x - \frac{12}{5} = -\frac{15}{4} \quad | +\frac{12}{5}$$

$$\frac{25}{6}x = -\frac{27}{20} \quad | \cdot \frac{25}{6}$$

$$\underline{x = -\frac{81}{250}}$$

$$\underline{= -0,324}$$

$$\frac{3}{2}x + \frac{2}{3}x =$$

$$\begin{matrix} (3) & (2) \end{matrix}$$

$$\frac{9}{6}x + \frac{4}{6}x = \frac{13}{6}x$$

$$\frac{13}{6}x + \frac{2}{1}x =$$

$$\begin{matrix} (1) & (6) \end{matrix}$$

$$\frac{13}{6}x + \frac{12}{6}x = \frac{25}{6}$$

$$52. a) x^2 - 7x + 6 = 0$$

$$x^2 - 7x + \frac{49}{4} - \frac{49}{4} + 6 = 0$$

$$\left(x - \frac{7}{2}\right)^2 - \frac{25}{4} = 0$$

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

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

$$\left(x - \frac{2}{2}\right) \left(x - \frac{12}{2}\right) = 0$$

$$(x-1)(x-6) = 0$$

$$\underline{(x-1) = 0 \Rightarrow x=1}$$

$$\underline{(x-6) = 0 \Rightarrow x=6}$$

$$b) 0,4x^2 - 2,4x = 0$$

$$\Delta = b^2 - 4ac$$

$$ax^2 - bx = c$$

$$\Delta = b^2 - 4 \cdot a \cdot c$$

$$= (-2,4)^2 - 4 \cdot 0,4 \cdot 0$$

$$= +5,76 - 0$$

$$= 5,76 > 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$x = \frac{-(-2,4) \pm 5,76}{2 \cdot 0,4} = \frac{2,4 \pm 5,76}{0,8}$$

$$\underline{x_1 = \frac{2,4 + 5,76}{0,8} = 10,2}$$

$$\underline{x_2 = \frac{2,4 - 5,76}{0,8} = -4,2}$$

$$c) 0,7x^2 - 4,9x + 8,4 = 0$$

$$\Delta = (-4,9)^2 - 4 \cdot 0,7 \cdot 8,4$$

$$= 24,01 - 23,52$$

$$= 0,49 > 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$x = \frac{-(-4,9) \pm 0,49}{2 \cdot 0,7} = \frac{4,9 \pm 0,49}{1,4}$$

$$\underline{x_1 = \frac{4,9 + 0,49}{1,4} = 3,85}$$

$$\underline{x_2 = \frac{4,9 - 0,49}{1,4} = 3,15}$$

$$d) \frac{1}{3}x^2 + \frac{2}{7}x + 2 = 0$$

$$\Delta = \left(\frac{2}{7}\right)^2 - 4 \cdot \frac{1}{3} \cdot 2$$

$$= \frac{4}{49} - \frac{8}{3}$$

$$= -2,6 < 0$$

x = kein Lösung

$$53. a) \text{ I } \left| \begin{array}{l} 2x - 3y = 5 \\ 5x + 6y = -1 \end{array} \right| \text{ I} \cdot 2$$

$$\text{ II } \left| \begin{array}{l} 5x + 6y = -1 \end{array} \right|$$

$$\text{ I } \left| \begin{array}{l} 4x - 6y = 10 \end{array} \right|$$

$$\text{ II } \left| \begin{array}{l} 5x + 6y = -1 \end{array} \right| \quad +$$

$$\text{ III } \left| \begin{array}{l} 9x = 9 \end{array} \right| : 9$$

$$\underline{x = 1}$$

$$\text{ I } \left| \begin{array}{l} 2 \cdot 1 - 3y = 5 \end{array} \right|$$

$$\left| \begin{array}{l} 2 - 3y = 5 \end{array} \right| - 2$$

$$\left| \begin{array}{l} -3y = 3 \end{array} \right| : -3$$

$$\underline{y = -1}$$

$$b) \text{ I } \left| \begin{array}{l} -5x + 2y = 17 \end{array} \right|$$

$$\text{ II } \left| \begin{array}{l} y = 1,5 - x \end{array} \right|$$

$$\text{ I } \left| \begin{array}{l} -5x + 2(1,5 - x) = 17 \end{array} \right|$$

$$\left| \begin{array}{l} -5x + 3 - 2x = 17 \end{array} \right|$$

$$\left| \begin{array}{l} -7x + 3 = 17 \end{array} \right| - 3$$

$$\left| \begin{array}{l} -7x = 14 \end{array} \right| : -7$$

$$\underline{x = -2}$$

$$\text{ II } \left| \begin{array}{l} y = 1,5 - (-2) \end{array} \right|$$

$$\underline{y = 3,5}$$

$$c) \text{ I } |x = 2y + 3|$$

$$\text{II } |x = 4 - y|$$

$$\text{I } |4 - y = 2y + 3| \quad | -2y$$

$$4 - 3y = 3 \quad | -4$$

$$-3y = -1 \quad | : -3$$

$$y = \underline{\underline{\frac{1}{3}}}$$

$$\text{I } |x = 2 \cdot \frac{1}{3} + 3|$$

$$x = \underline{\underline{\frac{11}{3}}}$$

$$d) \text{ I } |-x + 3y = 6| \cdot 2$$

$$\text{II } |2x - 6y = 0|$$

$$+ \text{ III } |-2x + 6y = 12|$$

$$\text{II } |2x - 6y = 0|$$

$$0 = 12 \text{ (kein Lösung)}$$

$$e) \text{ I } |1,2x + 3,6y = 4,8| \quad : 1,2$$

$$\text{II } |2,3x + 6,9y = 9,2| \quad : 2,3$$

$$\text{I } |x + 3y = 4|$$

$$\text{II } |x + 3y = 4|$$

$$\underline{\underline{x = 1 \quad y = 1}}$$

