

Einfache Gleichungen

$$2 \cdot x + 3 = 8$$

$$2x + 3 - 3 = 8 - 3$$

$$2 \cdot x = 5 \quad | : 2$$

$$x = 2,5$$

$$y = 2x - 3 \mid x = 6$$

$$y = 2 \cdot 6 - 3$$

$$y = 9$$

$$y = 10$$

$$10 = 2x - 3 \mid +3$$

$$13 = 2x \quad | :2$$

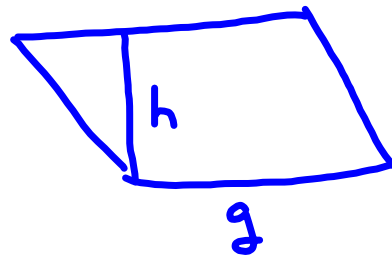
$$6,5 = x$$

$$A = g \cdot h$$

$$360 = g \cdot 12 \quad | :12$$

$$\frac{360}{12} = g$$

$$30 = g$$



$$h = 12 \text{ cm}$$

$$A = 360 \text{ cm}^2$$

$$g = ?$$

Gleichungen mit 2 Unbekannten

$$x = y$$

unendlich viele Lösungen

$$5 = 5$$

$$7 = 7$$

$$10234 = 10234$$

$$-8 = -8$$

$$\sqrt{5} = \sqrt{5}$$

Gleichungssystem (Gleichsetzungs v.)

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

$$y = 2 \cdot (-0,25) + 3$$

$$\text{II } y = -2x + 2$$

$$y = -0,5 + 3$$

$$\begin{array}{r} -2x + 2 = 2x + 3 \quad | -2 \\ -2x \quad \quad = 2x + 1 \quad | -2x \\ -4x \quad \quad = 1 \quad \quad | :(-4) \\ x \quad \quad \quad = -0,25 \quad | \text{ in I} \end{array}$$

$$y = 2,5$$

Vorzeichenregeln

Addition/Subtraktion

$$5 + 3 = 8$$

$$5 - 3 = 2$$

$$-5 + 3 = -2$$

$$-5 - 3 = -8$$

Multiplikation/Division

$$8 \cdot 4 = 32 \quad 8 : 4 = 2$$

$$8 \cdot (-4) = -32 \quad 8 : (-4) = -2$$

$$-8 \cdot 4 = -32 \quad -8 : 4 = -2$$

$$-8 \cdot (-4) = 32 \quad -8 : (-4) = 2$$

Gleichungssysteme (Einsetzungsverfahren)

$$\text{I } x + y = 10$$

$$\text{II } x = y + 5 \text{ einsetzen in I}$$

$$\text{I } y + 5 + y = 10$$

$$2y + 5 = 10 \quad | -5$$

$$2y = 5 \quad | :2$$

$$y = 2,5 \text{ einsetzen in II}$$

$$\text{II } x = 2,5 + 5$$

$$x = 7,5$$

Gleichungssysteme (Additionsverf.)

$$\text{I } 2x + 3y = 61 \quad | \cdot 5$$

$$\text{II } 5x + 7y = 146 \quad | \cdot (-2)$$

$$\text{I } 10x + 15y = 305$$

$$\text{II } -10x - 14y = -292$$

$$\text{I+II} \quad y = 13 \quad | \text{in I}$$

$$\text{I } 2x + 39 = 61 \quad | -39$$

$$2x = 22 \quad | : 2$$

$$x = 11$$

$$\text{I } 2x + 3y = 61 \quad | \cdot 7$$

$$\text{II } 5x + 7y = 146 \quad | \cdot (-3)$$

$$\text{I } 14x + 21y = 427$$

$$\text{II } -15x - 21y = -438$$

$$\text{I+II} \quad -1x \quad = -11 \quad | : (-1)$$

$$x = 11$$

Quadratische Gleichungen pq-Formel

$$x^2 - 12x + 35 = 0$$

$$x^2 + px + q = 0$$

$$x_{1/2} = -\frac{-12}{2} \pm \sqrt{\left(\frac{-12}{2}\right)^2 - 35}$$

$$x_{1/2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

$$x_{1/2} = 6 \pm \sqrt{36 - 35}$$

$$x_{1/2} = 6 \pm \sqrt{1}$$

$$x_{1/2} = 6 \pm 1$$

$$x_1 = 7$$

$$x_2 = 5$$

Quadratische Gleichungen (Satz v. Nullprod.)

$$(x+7)(x-3) = 0 \quad (x+7)(x-3) = 0$$

$$x+7=0 \quad | -7$$

$$x_1 = -7$$

$$x-3=0 \quad | +3$$

$$x_2 = 3$$

$$x^2 - 3x + 7x - 21 = 0$$

$$x^2 + 4x - 21 = 0$$

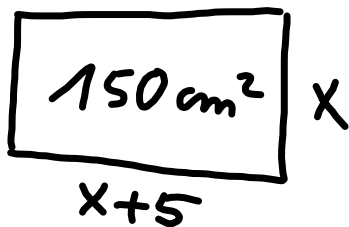
$$x_{1,2} = -\frac{4}{2} \pm \sqrt{\left(\frac{4}{2}\right)^2 + 21}$$

$$x_{1,2} = -2 \pm \sqrt{4 + 21}$$

$$x_{1,2} = -2 \pm \sqrt{25} \quad x_1 = 3$$

$$x_{1,2} = -2 \pm 5 \quad x_2 = -7$$

Anwendungen



$$A = a \cdot b \quad | A = 150 \quad a = x+5 \quad b = x$$

$$150 = (x+5) \cdot x$$

$$150 = x^2 + 5x \quad | -150$$

$$0 = x^2 + 5x - 150$$

Lange Seite 5 cm länger
als kurze

$$x_{1,2} = -\frac{5}{2} \pm \sqrt{\left(\frac{5}{2}\right)^2 + 150}$$

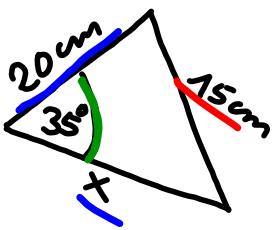
$$x_{1,2} = -2,5 \pm \sqrt{6,25 + 150}$$

$$x_{1,2} = -2,5 \pm \sqrt{156,25}$$

$$x_{1,2} = -2,5 \pm 12,5$$

$$x_1 = 10 \quad x_2 = -15$$

Anwendung $2 a^2 = b^2 + c^2 - 2bc \cdot \cos(\alpha)$



$$x_1 = 6,7$$

$$x_2 = 26,4$$

$$15^2 = 20^2 + x^2 - 2 \cdot 20 \cdot x \cdot \cos(35^\circ)$$

$$225 = 400 + x^2 - 40x \cdot \cos(35^\circ) \quad | -225$$

$$0 = 175 + x^2 - 40 \cdot \cos(35^\circ)x$$

$$x^2 - 40 \cos(35^\circ)x + 175 = 0$$

$$x_{1/2} = \frac{-(-40 \cos(35^\circ)) \pm \sqrt{(-40 \cos(35^\circ))^2 - 4 \cdot 175}}{2}$$

$$x_{1/2} = 16,38 \pm \sqrt{268,4 - 175}$$

$$x_{1/2} = 16,38 \pm \sqrt{93,4}$$

$$x_{1/2} = 16,38 \pm 9,7$$