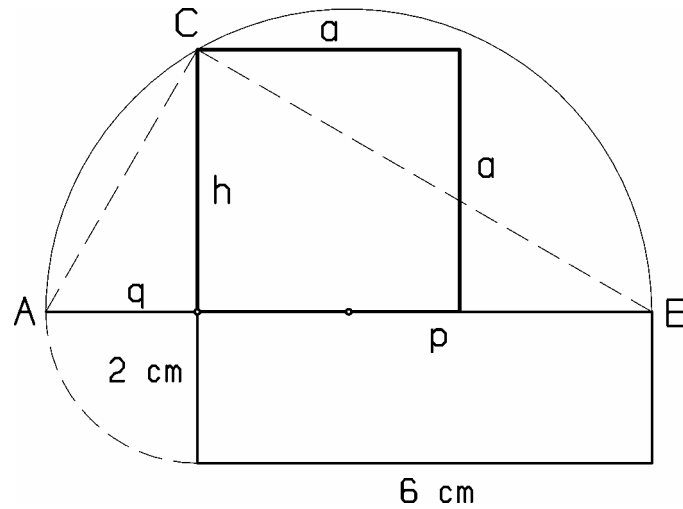


4. Mathematikstegreiferaufgabe

Klasse 9 / I / II

- Lösungen -

1.

2. Bestimmung von h – Pythagoras:

$$a^2 = q^2 + h^2$$

$$h = \sqrt{a^2 - q^2}$$

$$h = \sqrt{(8 \text{ cm})^2 - (6 \text{ cm})^2}$$

$$h = \sqrt{28} \text{ cm} \approx 5,3 \text{ cm}$$

Bestimmung von p – Pythagoras:

$$c^2 = a^2 + b^2$$

$$(q+p)^2 = a^2 + b^2 \quad (1)$$

$$b^2 = h^2 + p^2 \quad (2)$$

(2) in (1):

$$(q+p)^2 = a^2 + h^2 + p^2$$

$$(6+p)^2 = 8^2 + 28 + p^2$$

$$36 + 12p + p^2 = 92 + p^2$$

$$12p = 56$$

$$p = 4\frac{2}{3} \text{ cm}$$

Bestimmung von b – Pythagoras:

$$b^2 = h^2 + p^2$$

$$b = \sqrt{(\sqrt{28} \text{ cm})^2 + (4\frac{2}{3} \text{ cm})^2}$$

$$b = \frac{8}{3}\sqrt{7} \text{ cm} \approx 7,06 \text{ cm}$$

- Lösungen -

Bestimmung von c:

$$c = q + p$$

$$c = 6 \text{ cm} + 4 \frac{2}{3} \text{ cm}$$

$$\underline{\underline{c = 10 \frac{2}{3} \text{ cm}}}$$

Bestimmung von s – Pythagoras:

$$r^2 = b^2 + s^2 \quad (1)$$

$$\underline{\underline{(a+s)^2 = c^2 + r^2 \quad (2)}}$$

(1) in (2):

$$(a+s)^2 = c^2 + b^2 + s^2$$

$$a^2 + 2as + s^2 = c^2 + b^2 + s^2$$

$$2as = c^2 + b^2 - a^2$$

$b^2 = h^2 + p^2$ einsetzen

$$s = \frac{c^2 + h^2 + p^2 - a^2}{2a}$$

$$s = \frac{(10 \frac{2}{3} \text{ cm})^2 + (\sqrt{28} \text{ cm})^2 + (4 \frac{2}{3} \text{ cm})^2 - (8 \text{ cm})^2}{2 \cdot 8 \text{ cm}}$$

$$\underline{\underline{s = 6,2 \text{ cm}}}$$

3. Pythagoras:

$$r^2 = \left(\frac{d}{2}\right)^2 + (r-x)^2$$

$$7^2 = 6^2 + (7-x)^2$$

$$49 = 36 + 49 - 14x + x^2$$

$$0 = x^2 - 14x + 36$$

$$x_{1/2} = \frac{14 \pm \sqrt{14^2 - 4 \cdot 1 \cdot 36}}{2 \cdot 1}$$

$$\underline{\underline{x_{1/2} = 7 \pm \sqrt{13}}}$$

$$x_1 = 7 + \sqrt{13} \text{ cm} \approx 10,61 \text{ cm} \quad \text{keine Lös.}$$

$$\underline{\underline{x_2 = 7 - \sqrt{13} \text{ cm} \approx 3,39 \text{ cm}}}$$

