

Satz des Pythagoras

$$\begin{aligned} \underline{1. a.)} \quad d^2 &= s^2 + s^2 \\ d^2 &= 2s^2 && | : 2 \\ \frac{d^2}{2} &= s^2 && | \sqrt{\quad} \\ \underline{\sqrt{\frac{d^2}{2}}} &= s \end{aligned}$$

$$s = \sqrt{\frac{d^2}{2}} = \sqrt{\frac{5^2}{2}} = \sqrt{\frac{25}{2}} = \sqrt{12,5} \text{ cm} \approx \underline{\underline{3,5 \text{ cm}}}$$

$$\begin{aligned} \underline{b.)} \quad d^2 &= s^2 + s^2 \\ d^2 &= 2s^2 && | \sqrt{\quad} \\ \underline{d} &= \sqrt{2s^2} \end{aligned}$$

$$d = \sqrt{2(2\sqrt{3})^2} = \sqrt{24} \text{ cm} \approx \underline{\underline{4,9 \text{ cm}}}$$

$$\begin{aligned} \underline{2. a.)} \quad d^2 &= a^2 + b^2 && | - a^2 \\ d^2 - a^2 &= b^2 && | \sqrt{\quad} \\ \underline{\sqrt{d^2 - a^2}} &= b \end{aligned}$$

$$b = \sqrt{d^2 - a^2} = \sqrt{(5x)^2 - (2x)^2} = \sqrt{25x^2 - 4x^2} = \sqrt{21x^2} = \underline{\underline{\sqrt{21} x}}$$

$$\begin{aligned} \underline{b.)} \quad d^2 &= a^2 + b^2 && | \sqrt{\quad} \\ \underline{d} &= \sqrt{a^2 + b^2} \end{aligned}$$

$$d = \sqrt{a^2 + b^2} = \sqrt{(4\sqrt{5})^2 + \sqrt{3}^2} = \sqrt{80 + 3} = \sqrt{83} \text{ cm} \approx \underline{\underline{9,1 \text{ cm}}}$$

3. a.)

$$\begin{aligned} s^2 &= h^2 + \left(\frac{b}{2}\right)^2 \\ s^2 &= h^2 + \frac{b^2}{4} && | -h^2 \\ s^2 - h^2 &= \frac{b^2}{4} && | \cdot 4 \\ 4(s^2 - h^2) &= b^2 && | \sqrt{} \\ \sqrt{4(s^2 - h^2)} &= b \end{aligned}$$

$$\begin{aligned} b &= \sqrt{4(s^2 - h^2)} = \sqrt{4(4^2 - 3^2)} = \sqrt{4 \cdot (16 - 9)} = \sqrt{4 \cdot 7} \\ &= \sqrt{28} \text{ cm} \hat{=} \underline{\underline{5,3 \text{ cm}}} \end{aligned}$$

b.)

$$\begin{aligned} s^2 &= h^2 + \left(\frac{b}{2}\right)^2 \\ s^2 &= h^2 + \frac{b^2}{4} && | \sqrt{} \\ s &= \sqrt{h^2 + \frac{b^2}{4}} \end{aligned}$$

$$\begin{aligned} s &= \sqrt{h^2 + \frac{b^2}{4}} = \sqrt{(2x)^2 + \frac{(\sqrt{5}x)^2}{4}} = \sqrt{4x^2 + \frac{5x^2}{4}} \\ &= \sqrt{4x^2 + 1,25x^2} = \sqrt{5,25x^2} = \sqrt{5,25} x \hat{=} \underline{\underline{2,3x}} \end{aligned}$$

4. a.)

$$\begin{aligned} s^2 &= h^2 + \left(\frac{s}{2}\right)^2 \\ s^2 &= h^2 + \frac{s^2}{4} && | -\frac{s^2}{4} \\ s^2 - \frac{s^2}{4} &= h^2 && | \sqrt{} \\ \sqrt{s^2 - \frac{s^2}{4}} &= h \\ h &= \sqrt{\frac{3s^2}{4}} \end{aligned}$$

$$\begin{aligned} h &= \sqrt{\frac{3s^2}{4}} = \sqrt{\frac{3 \cdot 5^2}{4}} = \sqrt{\frac{75}{4}} = \sqrt{18,75} \text{ cm} \\ &\hat{=} \underline{\underline{4,3 \text{ cm}}} \end{aligned}$$

$$\begin{aligned}
 b.) \quad s^2 &= h^2 + \left(\frac{s}{2}\right)^2 \\
 s^2 &= h^2 + \frac{s^2}{4} \quad | -\frac{s^2}{4} \\
 s^2 - \frac{s^2}{4} &= h^2 \\
 \frac{3s^2}{4} &= h^2 \quad | \cdot 4 \\
 3s^2 &= 4h^2 \quad | : 3 \\
 s^2 &= \frac{4h^2}{3} \quad | \sqrt{} \\
 s &= \sqrt{\frac{4h^2}{3}}
 \end{aligned}$$

$$s = \sqrt{\frac{4h^2}{3}} = \sqrt{\frac{4(2,5x)^2}{3}} = \sqrt{\frac{25x^2}{3}} = \sqrt{\frac{25}{3}x^2} = \underline{\underline{\frac{\sqrt{25}}{\sqrt{3}}x}}$$

$$\begin{aligned}
 \underline{5.} \quad a.) \quad r^2 &= a^2 + \left(\frac{s}{2}\right)^2 \\
 r^2 &= a^2 + \frac{s^2}{4} \quad | -a^2 \\
 r^2 - a^2 &= \frac{s^2}{4} \quad | \cdot 4 \\
 4(r^2 - a^2) &= s^2 \quad | \sqrt{} \\
 \sqrt{4(r^2 - a^2)} &= s
 \end{aligned}$$

$$s = \sqrt{4(r^2 - a^2)} = \sqrt{4((1,5x)^2 - x^2)} = \sqrt{4(1,25x^2)} = \sqrt{5x^2} = \underline{\underline{\sqrt{5}x}}$$

$$\begin{aligned}
 b.) \quad r^2 &= a^2 + \left(\frac{s}{2}\right)^2 \\
 r^2 &= a^2 + \frac{s^2}{4} \quad | -\frac{s^2}{4} \\
 r^2 - \frac{s^2}{4} &= a^2 \quad | \sqrt{} \\
 \sqrt{r^2 - \frac{s^2}{4}} &= a
 \end{aligned}$$

$$a = \sqrt{r^2 - \frac{s^2}{4}} = \sqrt{3^2 - \frac{6,5^2}{4}} = \sqrt{9 - 10,5625} \rightarrow \underline{\underline{\text{unlösbar!}}}$$