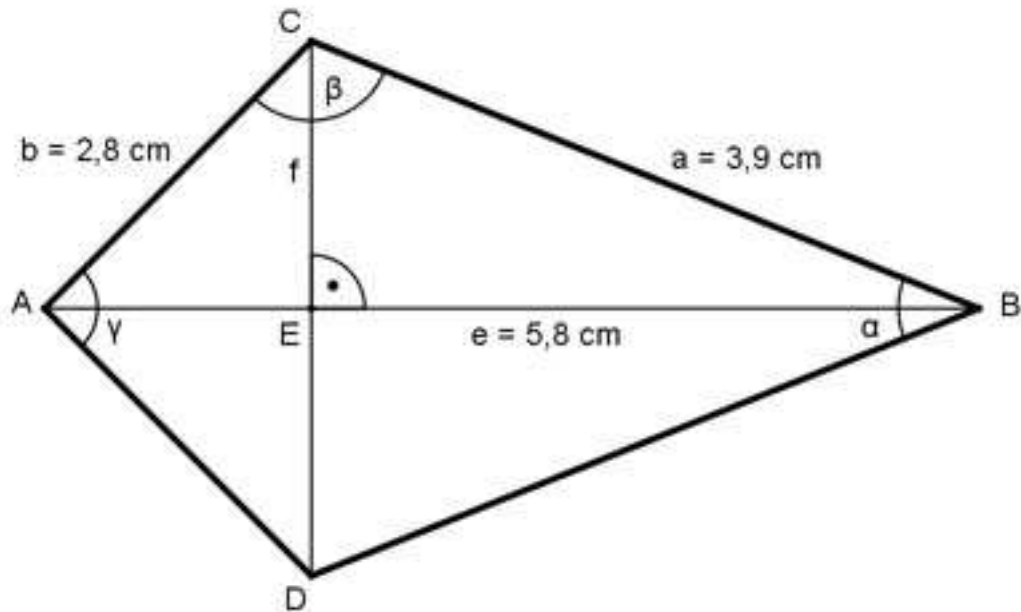


Trigonometrie Aufgabe 159

Wie groß ist die Diagonale f des Drachenvierecks?



Im Dreieck ABC:

Fall SSS:

$$e^2 = a^2 + b^2 - 2 * a * b * \cos \beta \quad | \quad +2 * a * b * \cos \beta$$

$$e^2 + 2 * a * b * \cos \beta = a^2 + b^2 \quad | \quad -e^2$$

$$2 * a * b * \cos \beta = a^2 + b^2 - e^2 \quad | \quad :2 * a * b$$

$$\cos \beta = \frac{a^2 + b^2 - e^2}{2 * a * b} = \frac{3,9^2 + 2,8^2 - 5,8^2}{2 * 3,9 * 2,8} = -0,4849 \quad \rightarrow \quad \beta = 119^\circ$$

Im Dreieck ABC:

Fall SSW:

Sinussatz:

$$\frac{e}{\sin \beta} = \frac{b}{\sin \alpha/2} \quad | \quad * \sin \alpha/2$$

$$\frac{e * \sin \alpha/2}{\sin \beta} = b \quad | \quad * \sin \beta$$

$$e * \sin \alpha/2 = b * \sin \beta \quad | :e$$

$$\sin \alpha/2 = \frac{b * \sin \beta}{e} = \frac{2,8 \text{ cm} * \sin 119^\circ}{5,8 \text{ cm}} = \frac{2,8 \text{ cm} * 0,8746}{5,8 \text{ cm}} = 0,4222$$

$$\alpha/2 = 25^\circ$$

$$\alpha = 50^\circ$$

Im Dreieck EBC:

$$\sin \alpha/2 = \frac{f/2}{a} \quad | *a$$

$$f/2 = a * \sin \alpha/2 \quad | *2$$

$$f = 2 * a * \sin \alpha/2$$

$$\mathbf{f = 2 * 3,9 \text{ cm} * \sin 25^\circ = 2 * 3,9 \text{ cm} * 0,4226 = 3,3 \text{ cm}}$$