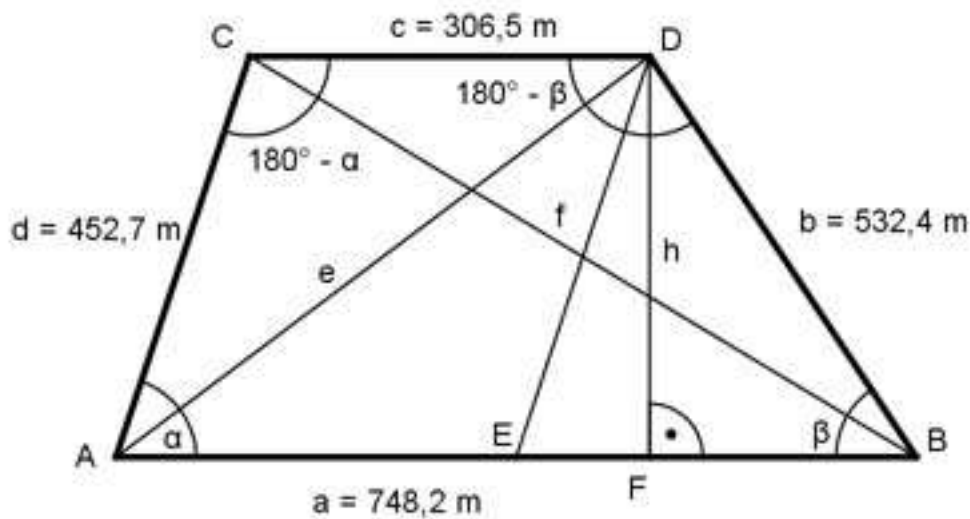


## Trigonometrie Aufgabe 153

Wie groß sind die Diagonalen e und f des Trapezes?



$ED = d = 452,7 \text{ m}$  (Parallele zu  $d$ )

$EB = a - c = 748,2 \text{ m} - 306,5 \text{ m} = 441,7 \text{ m}$

Im Dreieck  $EBD$ :

Fall SSS:

Cosinussatz:

$$d^2 = EB^2 + b^2 + 2 * EB * b * \cos \beta \quad | \quad +2 * EB * b * \cos \beta$$

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

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

$$\cos \beta = \frac{EB^2 + b^2 - d^2}{2 * EB * b} = \frac{441,7^2 + 532,4^2 - 452,7^2}{2 * 441,7 * 532,4} = 0,5818 \rightarrow$$

$$\beta = 54,4^\circ$$

$$180^\circ - \beta = 180^\circ - 54,4^\circ = 125,6^\circ$$

Im Dreieck  $CBD$ :

Fall SWS:

$$f^2 = b^2 + c^2 - 2 * b * c * \cos 125,6^\circ$$

$$f^2 = 532,4^2 + 306,5^2 - 2 * 532,4 * 306,5 * (-0,5818) = 567\ 269$$

$$f^2 = 567\ 269 \quad | \sqrt{\quad}$$

$$\mathbf{f = 753,2\ m}$$

Im Dreieck ABC:

Fall SSS:

Cosinussatz:

$$f^2 = a^2 + d^2 + 2 * a * d * \cos \alpha \quad | \quad +2 * a * d * \cos \alpha$$

$$f^2 + 2 * a * d * \cos \alpha = a^2 + d^2 \quad | \quad -f^2$$

$$2 * a * d * \cos \alpha = a^2 + d^2 - f^2 \quad | \quad :2 * a * d$$

$$\cos \alpha = \frac{a^2 + d^2 - f^2}{2 * a * d} = \frac{748,2^2 + 452,7^2 - 753,2^2}{2 * 748,2 * 452,7} = 0,2914 \quad \rightarrow$$

$$\alpha = 73^\circ$$

$$180^\circ - \alpha = 180^\circ - 73^\circ = 107^\circ$$

Im Dreieck ADC:

Fall SWS:

$$e^2 = c^2 + d^2 - 2 * c * d * \cos 107^\circ$$

$$e^2 = 306,5^2 + 452,7^2 - 2 * 306,5 * 452,7 * (-0,2914) = 379\ 744,5$$

$$e^2 = 379\ 744,5 \quad |$$

$$\mathbf{e = 616,2\ m}$$