

Pflichtaufgaben

Aufgabe 2019 P1:

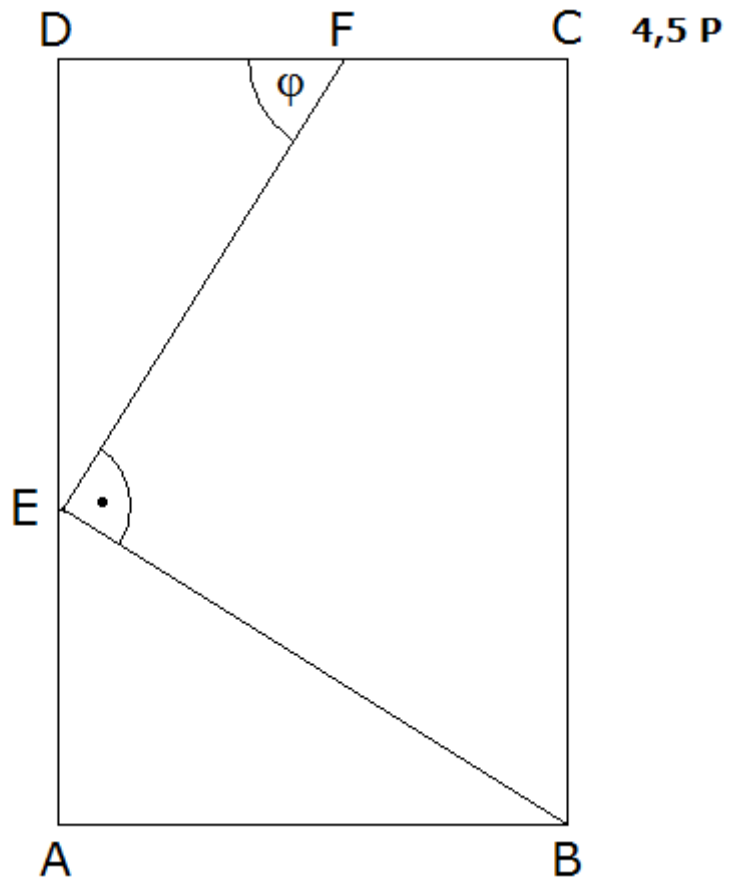
Im Rechteck ABCD gilt:

$$\overline{AB} = \overline{CD} = 6,6 \text{ cm}$$

$$\overline{EF} = 7,2 \text{ cm}$$

$$\varphi = 59,0^\circ$$

Berechnen Sie den Umfang des Vierecks EBCF.



Strategie 2019 P1:

Gegeben:

$$\overline{AB} = \overline{CD} = 6,6 \text{ cm}$$

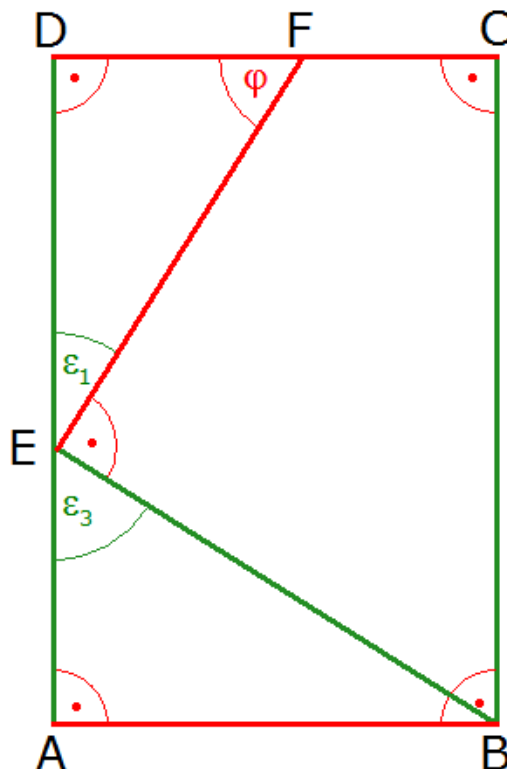
$$\overline{EF} = 7,2 \text{ cm}$$

$$\varphi = 59,0^\circ$$

Gesucht:

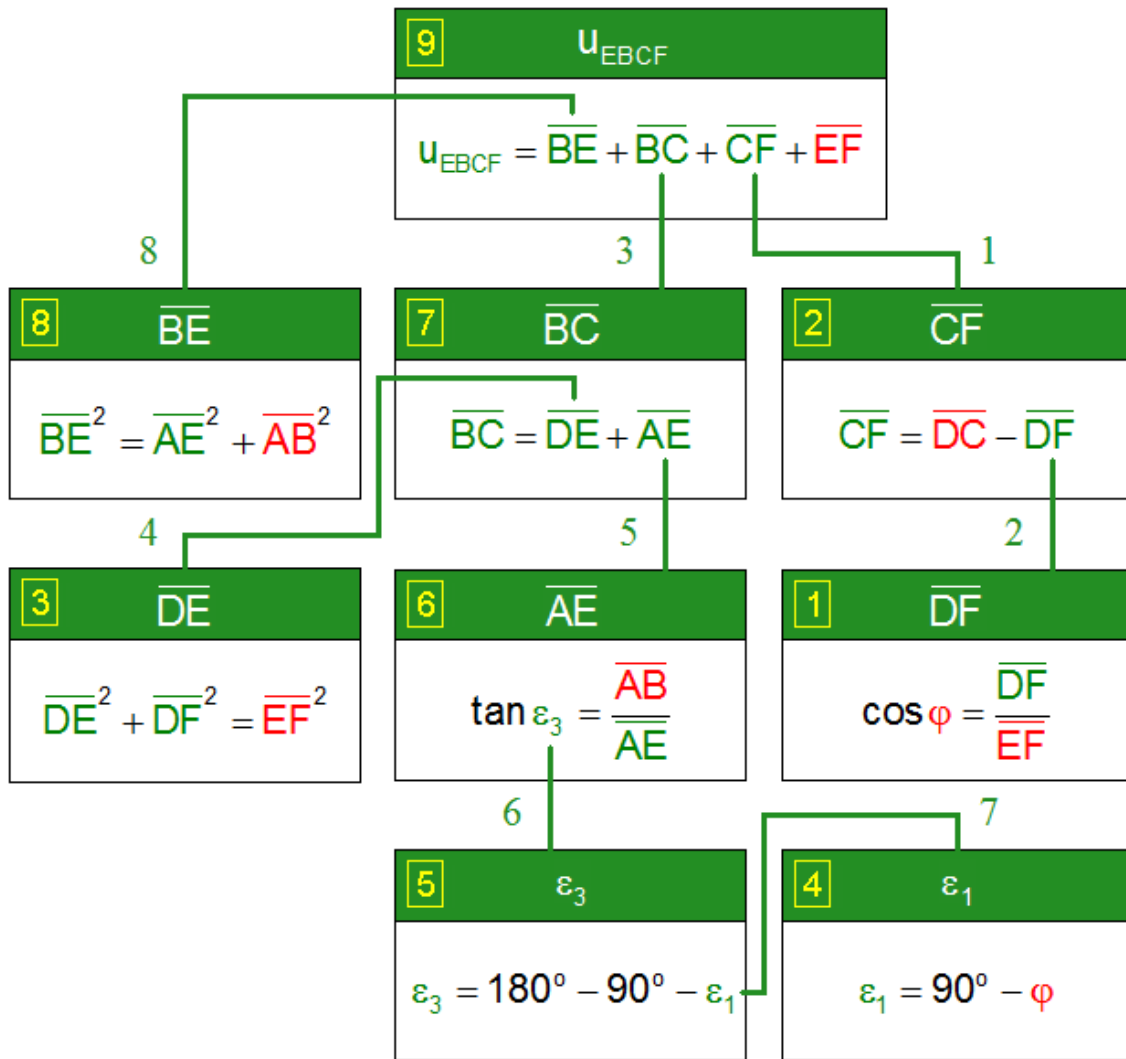
$$U_{EBCF}$$

Skizze:



Strategie 2019 P1:

Struktogramm:



Lösung 2019 P1:

1. Berechnung der Strecke \overline{DF} :

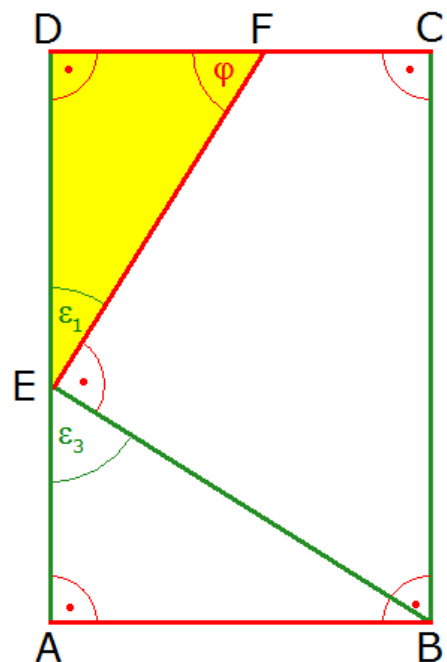
$\cos \varphi = \frac{\text{Ankathete}}{\text{Hypotenuse}} = \frac{\overline{DF}}{\overline{EF}}$ Kosinusfunktion im rechtwinkligen gelben Dreieck DEF

$\cos 59^\circ = \frac{\overline{DF}}{7,2}$

$0,5150 = \frac{\overline{DF}}{7,2}$ Seiten tauschen

$\frac{\overline{DF}}{7,2} = 0,5150 \quad | \cdot 7,2$

$\underline{\overline{DF} = 3,71 \text{ cm}}$



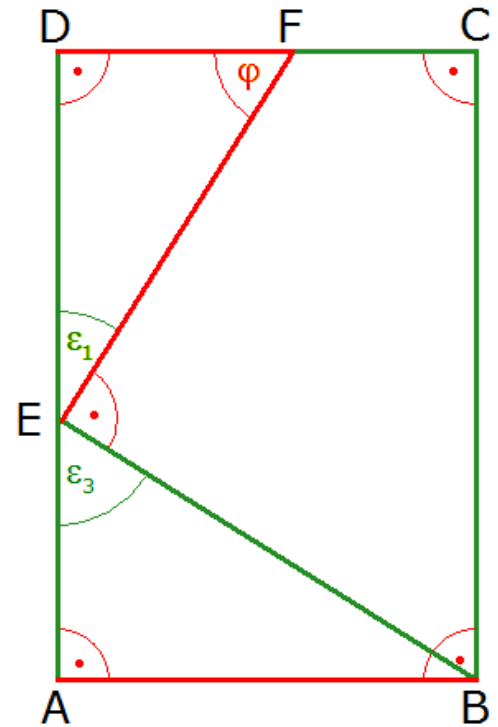
Lösung 2019 P1:

2. Berechnung der Strecke \overline{CF} :

$$\overline{CF} = \overline{DC} - \overline{DF}$$

$$\overline{CF} = 6,6 - 3,71$$

$$\overline{CF} = \underline{2,89 \text{ cm}}$$



3. Berechnung der Strecke \overline{DE} :

$$\overline{DE}^2 + \overline{DF}^2 = \overline{EF}^2$$

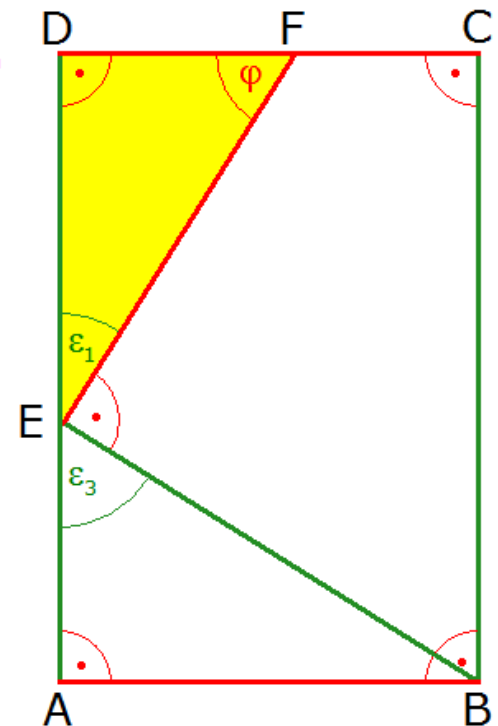
$$\overline{DE}^2 + 3,71^2 = 7,2^2$$

$$\overline{DE}^2 + 13,7641 = 51,84 \quad | -13,7641$$

$$\overline{DE}^2 = 38,0759 \quad | \sqrt{\quad}$$

$$\overline{DE} = \underline{6,17 \text{ cm}}$$

Pythagoras im rechtwinkligen
gelben Teildreieck DEF



Lösung 2019 P1:

4. Berechnung des Winkels ε_1 :

$$\varepsilon_1 = 90^\circ - \varphi$$

$$\varepsilon_1 = 90^\circ - 59^\circ$$

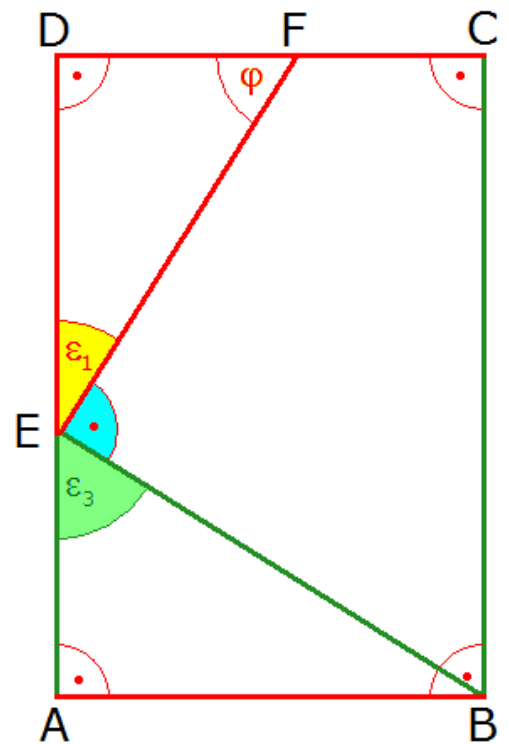
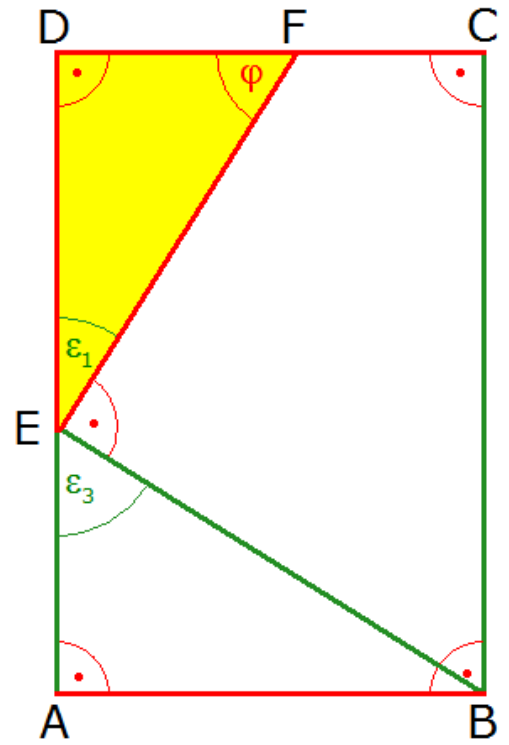
$$\underline{\varepsilon_1 = 31^\circ}$$

5. Berechnung des Winkels ε_3 :

$$\varepsilon_3 = 180^\circ - 90^\circ - \varepsilon_1$$

$$\varepsilon_3 = 180^\circ - 90^\circ - 31^\circ$$

$$\underline{\varepsilon_3 = 59^\circ}$$



Lösung 2019 P1:

6. Berechnung der Strecke \overline{AE} :

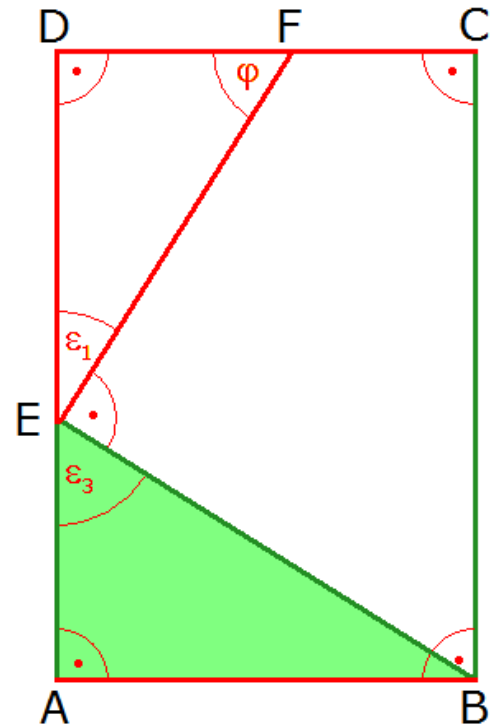
$$\tan \varepsilon_3 = \frac{\text{Gegenkathete}}{\text{Ankathete}} = \frac{\overline{AB}}{\overline{AE}} \quad \text{Tangensfunktion im rechtwinkligen hellgrünen Dreieck AED}$$

$$\tan 59^\circ = \frac{6,6}{\overline{AE}}$$

$$1,6643 = \frac{6,6}{\overline{AE}} \quad | \cdot \overline{AE}$$

$$\overline{AE} \cdot 1,6643 = 6,6 \quad | : 1,6643$$

$$\underline{\overline{AE} = 3,97 \text{ cm}}$$

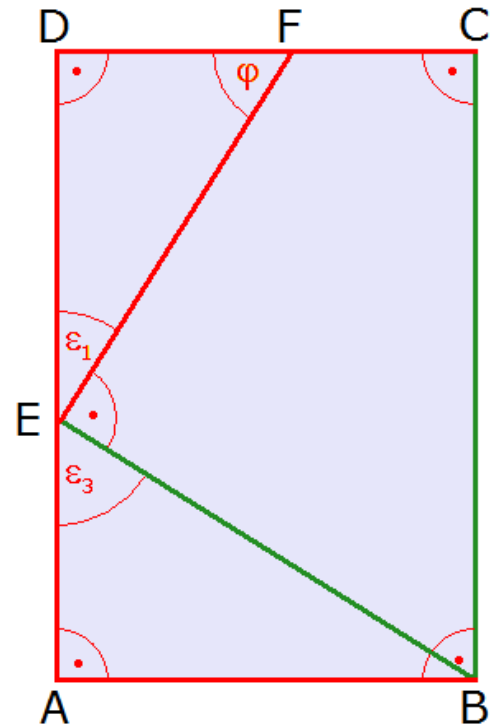


7. Berechnung der Strecke \overline{BC} :

$$\overline{BC} = \overline{DE} + \overline{AE}$$

$$\overline{BC} = 6,17 + 3,97$$

$$\underline{\overline{BC} = 10,14 \text{ cm}}$$



Lösung 2019 P1:

8. Berechnung der Strecke \overline{BE} :

$$\overline{BE}^2 = \overline{AE}^2 + \overline{AB}^2$$

Pythagoras im rechtwinkligen
hellgrünen Teildreieck ABE

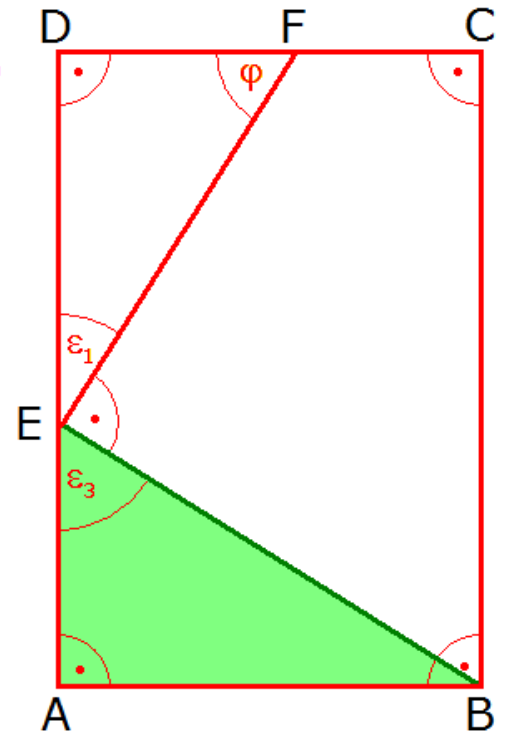
$$\overline{BE}^2 = 3,97^2 + 6,6^2$$

$$\overline{BE}^2 = 15,7609 + 43,56$$

$$\overline{BE}^2 = 59,3209$$

$\sqrt{\quad}$

$$\underline{\underline{\overline{BE} = 7,70 \text{ cm}}}$$



9. Berechnung des Viereckumfangs u_{EBCF} :

$$u_{EBCF} = \overline{BE} + \overline{BC} + \overline{CF} + \overline{EF}$$

$$u_{EBCF} = 7,70 + 10,14 + 2,89 + 7,2$$

$$\underline{\underline{u_{EBCF} = 27,93 \text{ cm}}}$$

