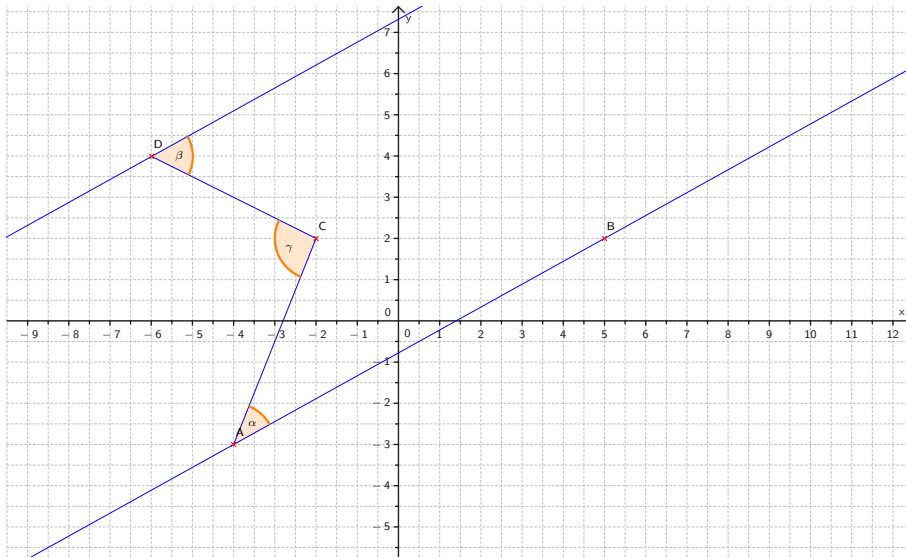


Winkelgesetze (Lösungen)

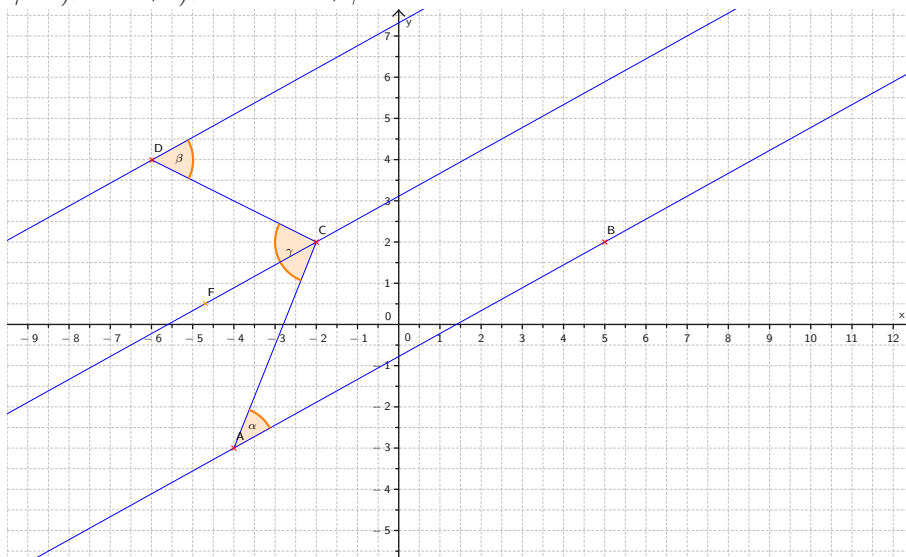
07wh009 1. $\alpha = 50^\circ$ $\beta = 40^\circ$ $\varphi = 140^\circ$ $\varepsilon = 40^\circ$ $\delta = 40^\circ$

07sn022 2. (a) $114,5^\circ$, $129^\circ 15'$, $14,75^\circ$, $165,25^\circ$
 (b) $\alpha = 56^\circ$, $\beta = 31^\circ$, $\gamma = 93^\circ$

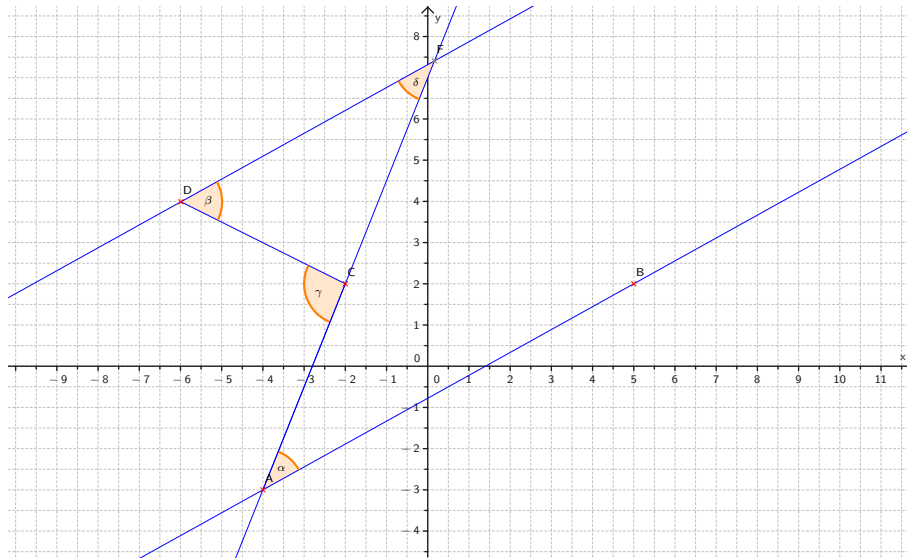
07cm085 3. (a)



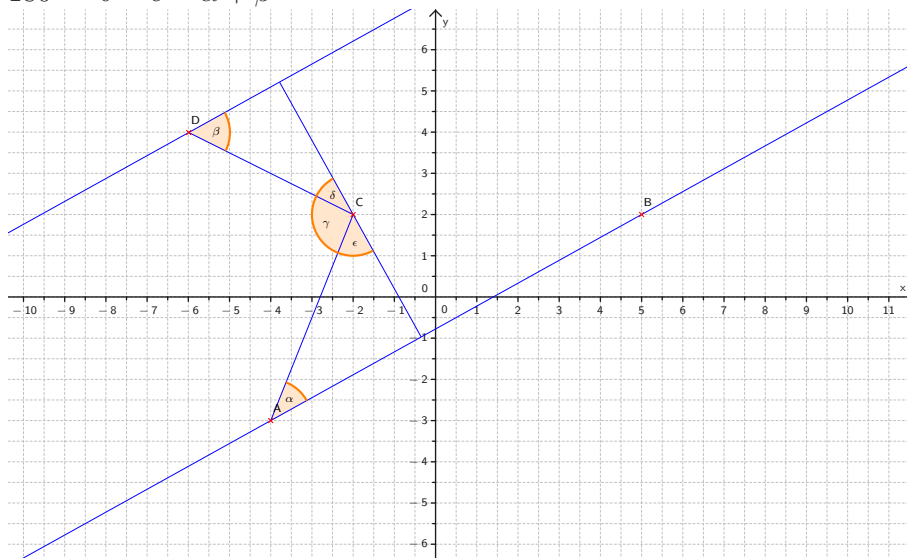
(b) • Lösung 1: $\alpha = \sphericalangle DCF$, $\beta = \sphericalangle FCA$ (Wechselwinkel an parallelen Geraden) \implies
 $\gamma = \sphericalangle DCF + \sphericalangle FCA = \alpha + \beta$



• Lösung 2: $\delta = \beta$ (Wechselwinkel an parallelen Geraden) $\implies \gamma = \alpha + \beta$ (Außenwinkel im Dreieck)



- Lösung 3: $\delta = 90^\circ - \alpha$, $\epsilon = 90^\circ - \beta$ (Winkelsumme im Dreieck) $\implies \gamma = 180^\circ - \delta - \epsilon = \alpha + \beta$



(c) vgl. (b)

07rr054

4. (a) $\alpha = \beta = \gamma = 90^\circ$
 (b) $\alpha = 60^\circ$, $\gamma = 40^\circ$, $\beta = \delta = 80^\circ$
 (c) $\beta = 20^\circ$, $\epsilon = \alpha = \varphi = \gamma = 90^\circ - 20^\circ = 70^\circ$
 $\sigma = \delta = 90^\circ - \varphi = 20^\circ$

07rr055

5. (a) $\alpha + 2\alpha + 4\alpha + 8\alpha = 15\alpha = 180^\circ \implies \alpha = 12^\circ$
 $\beta = 24^\circ$, $\gamma = 48^\circ$ und $\delta = 96^\circ$
 (b) $\alpha + 3\alpha + \frac{9}{2}\alpha + 6\alpha = \frac{29}{2}\alpha = 180^\circ \implies \alpha = \left(\frac{360}{29}\right)^\circ = \left(12\frac{12}{29}\right)^\circ$
 $\beta = \left(37\frac{7}{29}\right)^\circ$, $\gamma = \left(55\frac{25}{29}\right)^\circ$ und $\delta = \left(74\frac{14}{29}\right)^\circ$

07rr075

6. e und f, g und h, l und m

07rr076

7. Die beiden Winkel an der Geraden g müssen gleich sei.

07rr077

8. $\alpha = 180^\circ - 92^\circ = 88^\circ$

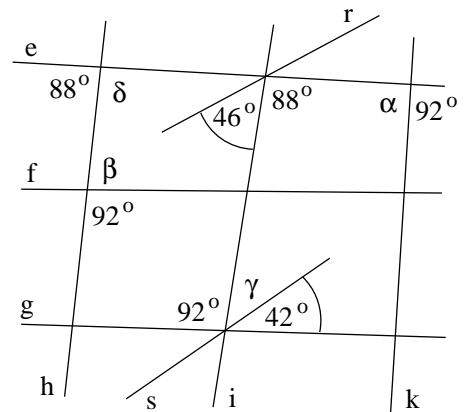
$\implies h \parallel k$ (Stufenwinkel)

$\beta = 180^\circ - 92^\circ = 88^\circ$

$\implies e \parallel f$ (Wechselwinkel)

$\gamma = 180^\circ - 92^\circ - 42^\circ = 46^\circ$

$\implies r \parallel s$ (Wechselwinkel)



07ha013

9. Bedingung für Eckenzahl n : $(n - 2) \cdot 180^\circ = 1620^\circ$

$\implies n = 11$

07sn023

10. (c) $\varepsilon = 90^\circ + \frac{1}{2}\beta$