Übungen zu den Winkelsätzen - Aufgaben zum Grundwissenkatalog

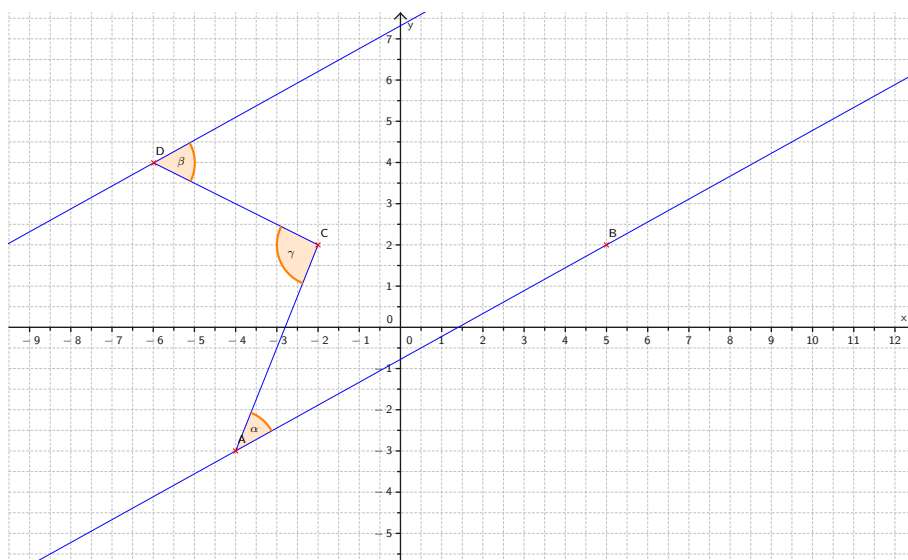1. (a) $\alpha = \beta = \gamma = 90°$

   (b) $\alpha = 60°$, $\gamma = 40°$, $\beta = \delta = 80°$

   (c) $\beta = 20°$, $\varepsilon = \alpha = \varphi = \gamma = 90° - 20° = 70°$

   $\sigma = \delta = 90° - \varphi = 20°$

2. (a) $\alpha + 2\alpha + 4\alpha + 8\alpha = 15\alpha = 180° \quad \Longrightarrow \quad \alpha = 12°$

   $\beta = 24°$, $\gamma = 48°$ und $\delta = 96°$

   (b) $\alpha + 3\alpha + \dfrac{9}{2}\alpha + 6\alpha = \dfrac{29}{2}\alpha = 180° \quad \Longrightarrow \quad \alpha = \left(\dfrac{360}{29}\right)^{\circ} = \left(12\dfrac{12}{29}\right)^{\circ}$

   $\beta = \left(37\dfrac{7}{29}\right)^{\circ}$, $\gamma = \left(55\dfrac{25}{29}\right)^{\circ}$ und $\delta = \left(74\dfrac{14}{29}\right)^{\circ}$

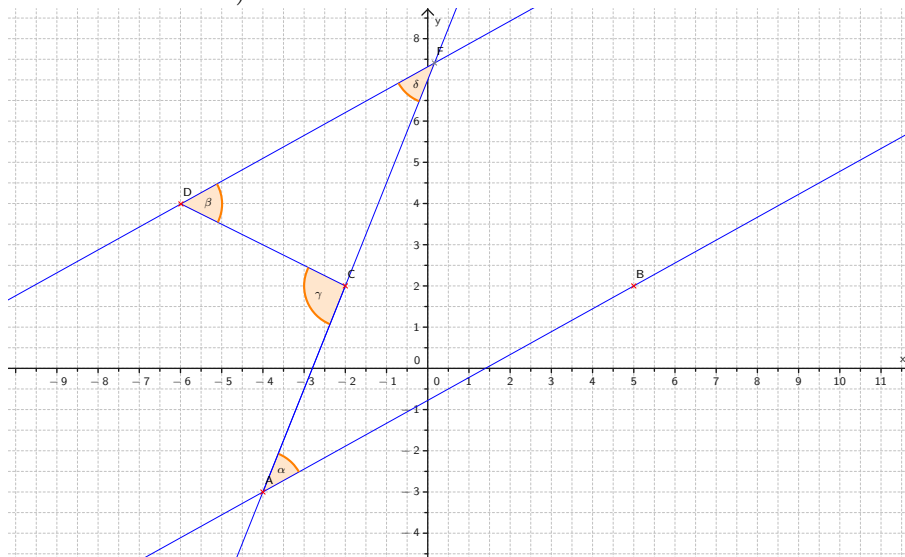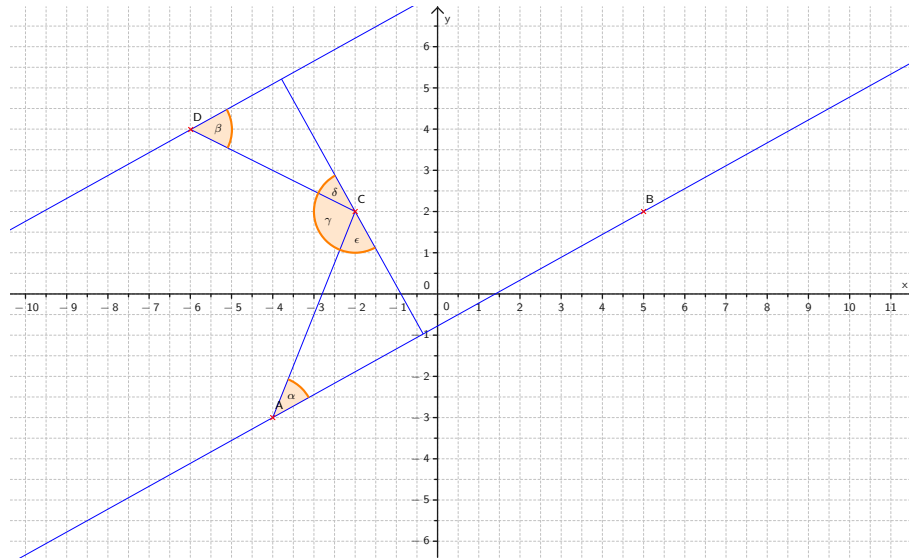3. Die beiden Winkel an der Geraden g müssen gleich sei.

4. (a)

   (b) • Lösung 1: $\alpha = \sphericalangle \mathrm{DCF}$, $\beta = \sphericalangle \mathrm{FCA}$ (Wechselwinkel an parallelen Geraden) $\Longrightarrow$
   $\gamma = \sphericalangle \mathrm{DCF} + \sphericalangle \mathrm{FCA} = \alpha + \beta$
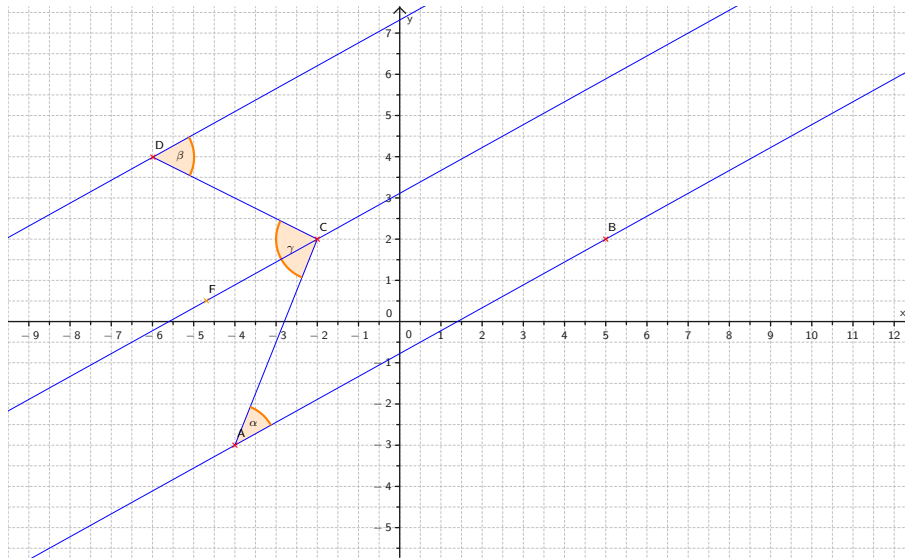
- Lösung 2: $\delta = \beta$ (Wechselwinkel an parallelen Geraden) $\implies \gamma = \alpha + \beta$ (Außenwinkel im Dreieck)

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

(c) vgl. (b)

5. $\alpha = 50°$ $\beta = 40°$ $\varphi = 140°$ $\varepsilon = 50°$ $\delta = 40°$

6.   (a) $(n-2) \cdot 180°$
      (b) $144°$