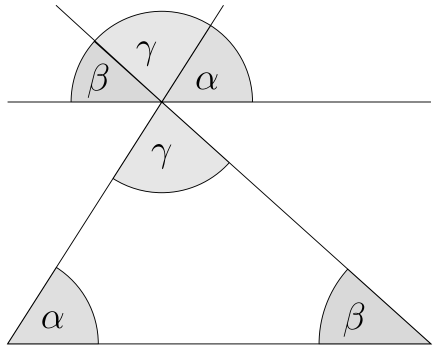
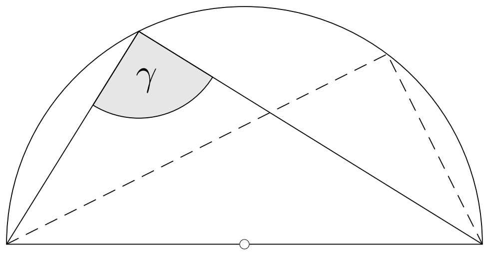
Geometrie Grundwissen



$\alpha + \beta + \gamma = 180°$

Die Winkelsumme im Dreieck beträgt 180°.

Euklid von Alexandria, 3. Jahrhundert v. Chr.

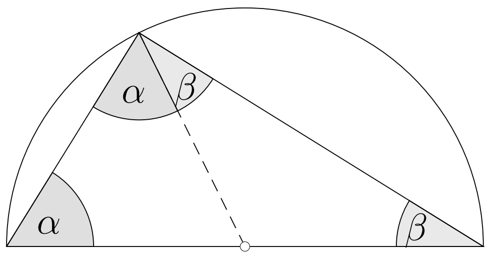


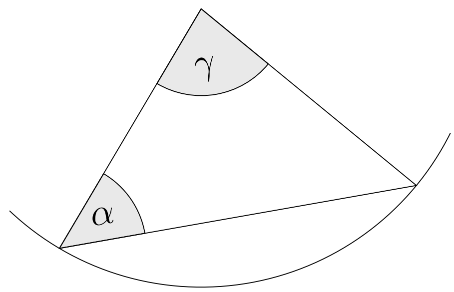
Der Satz des Thales: $\gamma = 90°$

Jeder Winkel im Halbkreis ist ein rechter.

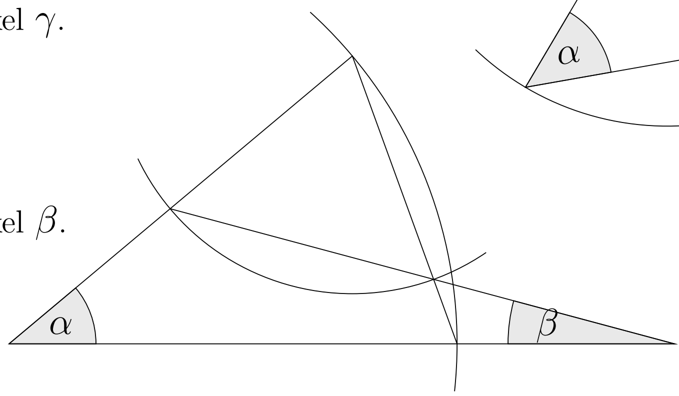
Beweis:

$$\begin{aligned} \alpha + \beta + \beta + \alpha &= 180° \\ 2\alpha + 2\beta &= 180° \quad | : 2 \\ \alpha + \beta &= 90° \end{aligned}$$



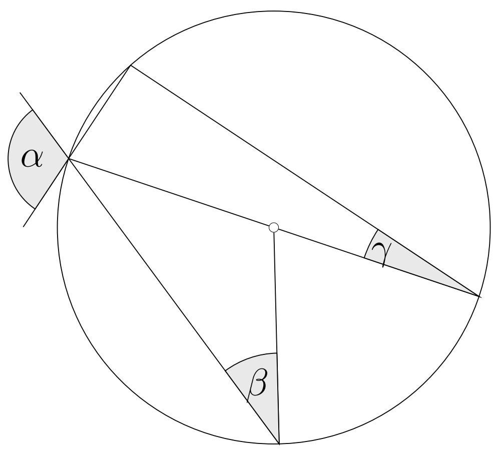


1. Bestimme den Winkel γ.
   $\alpha = 48°$



2. Bestimme den Winkel β.
   $\alpha = 40°$

3. Bestimme den Winkel γ.
   $\alpha = 110°$
   $\beta = 35°$



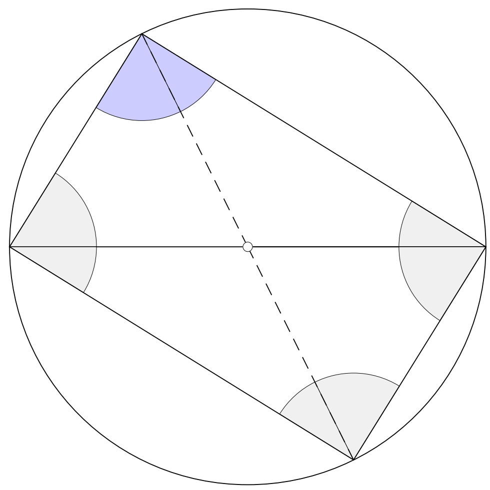
Geometrie Grundwissen Ergebnisse

1. $\gamma = 84°$

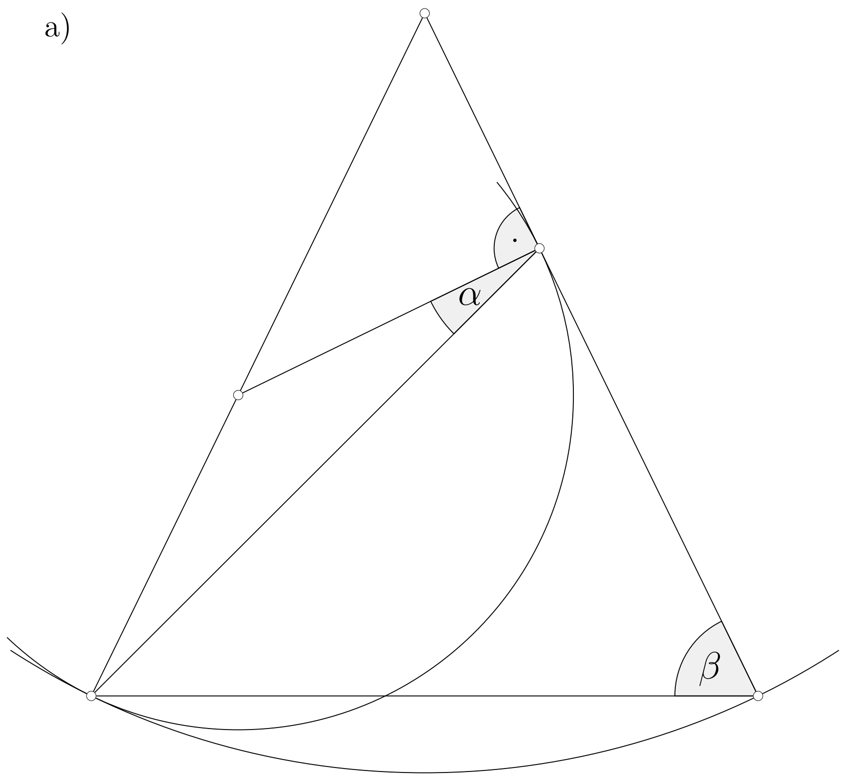
2. $\beta = 15°$

3. $\gamma = 15°$

Thales auf einen Blick

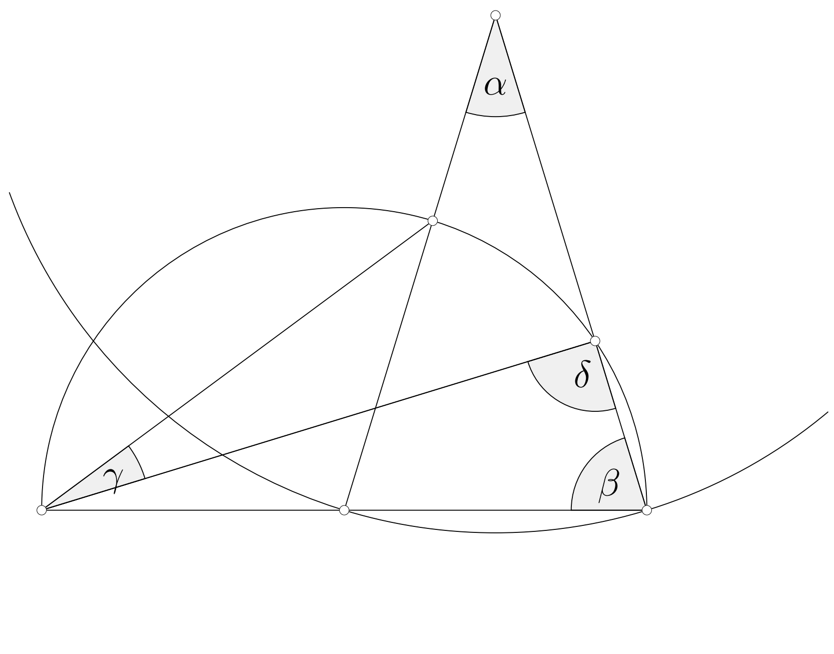


a)



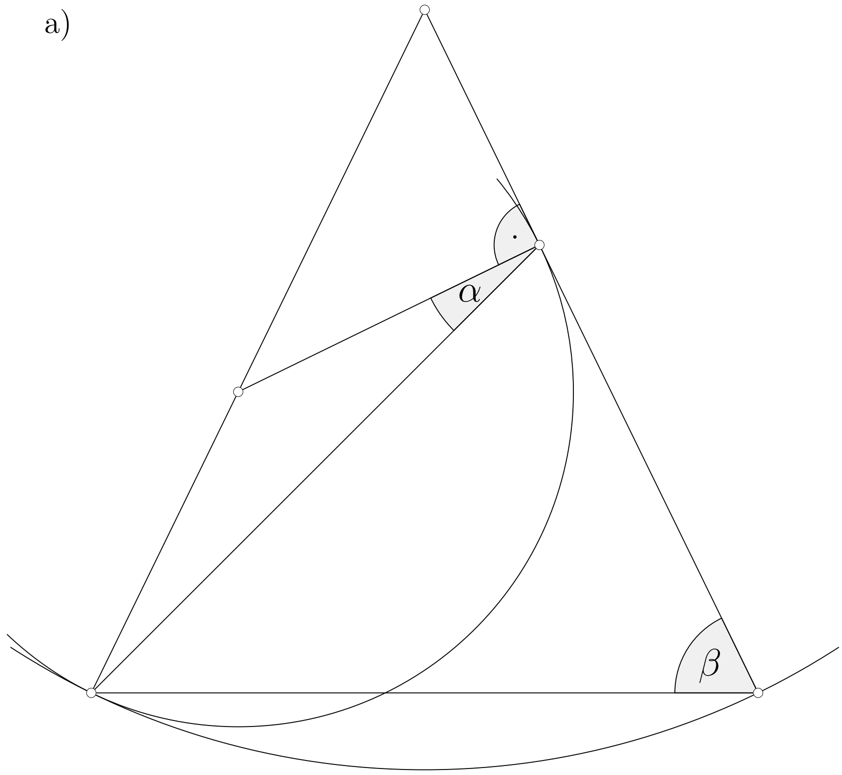
Gegeben $\beta = 64°$.
Bestimme den Winkel α.

b)



Gegeben $\alpha = 34°$.
Bestimme die Winkel β und γ.

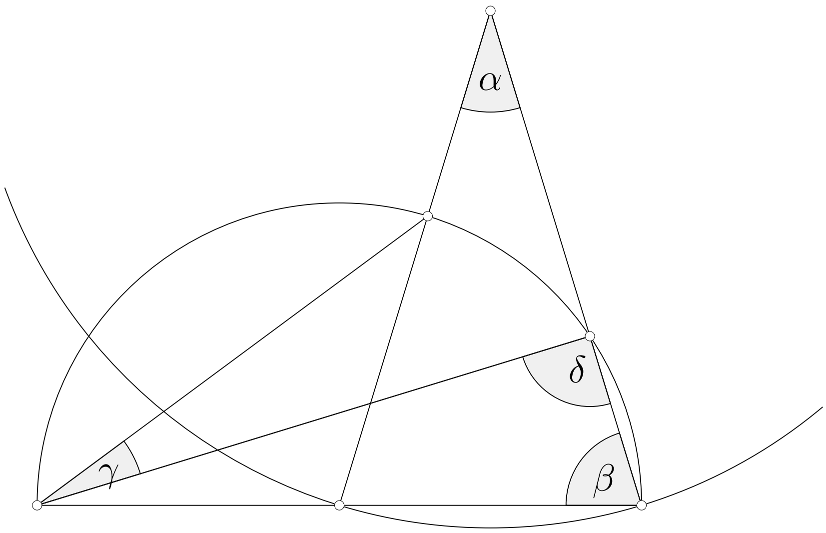
a)



Gegeben $\beta = 64°$.
Bestimme den Winkel α.

$\alpha = 19°$

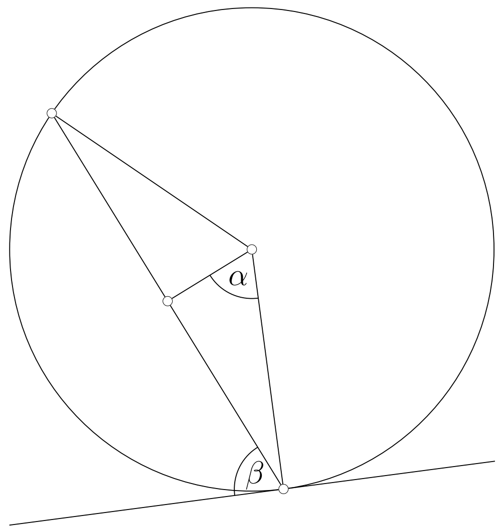
b)



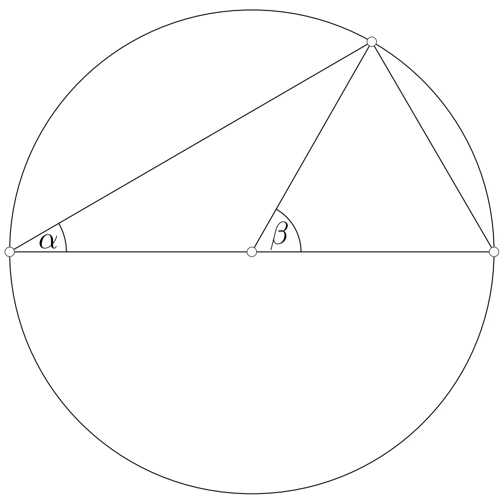
Gegeben $\alpha = 34°$.
Bestimme die Winkel β und γ.

$\beta = 73°$
$\gamma = 19{,}5°$

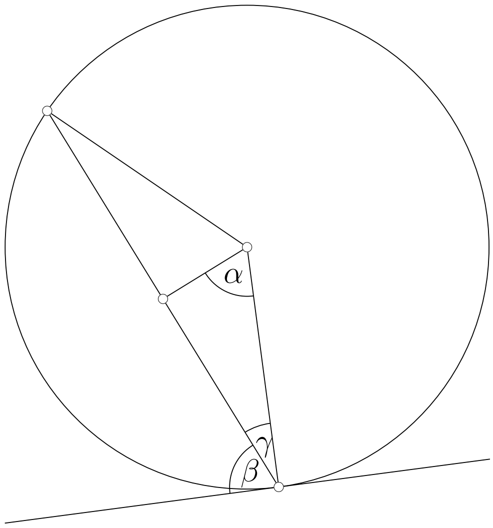
c) Begründe $\alpha = \beta$.



d) Begründe $\beta = 2\alpha$.

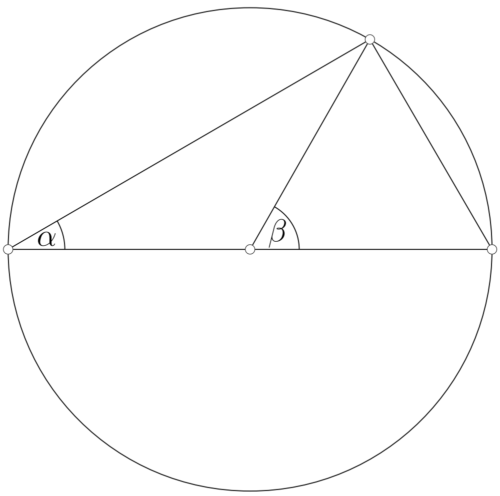


c) Begründe $\alpha = \beta$.



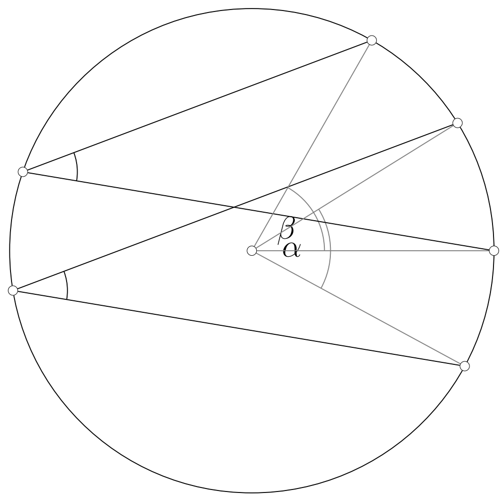
$$\begin{aligned} \alpha &= 90° - \gamma \qquad &|\text{beachte die Winkelsumme im Dreieck} \\ \beta &= 90° - \gamma \end{aligned}$$

d) Begründe $\beta = 2\alpha$.

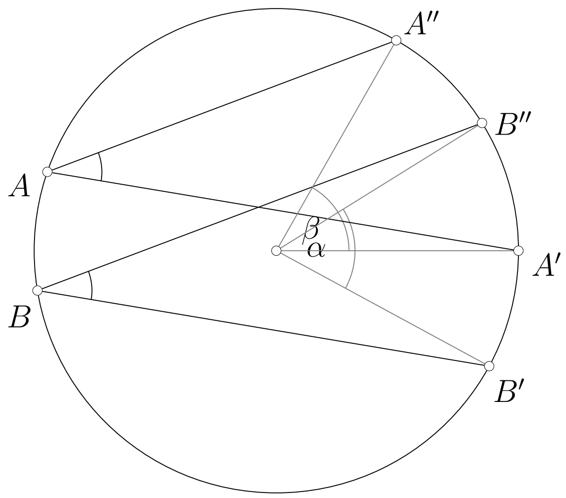


$$\begin{aligned} 2\alpha + (180° - \beta) &= 180° \\ \beta &= 2\alpha \end{aligned}$$

e) Die Scheitel zweier Winkel mit paarweise parallelen Schenkeln liegen auf einem Kreis. Begründe $\alpha = \beta$.



e) Die Scheitel zweier Winkel mit paarweise parallelen Schenkeln liegen auf einem Kreis. Begründe $\alpha = \beta$.

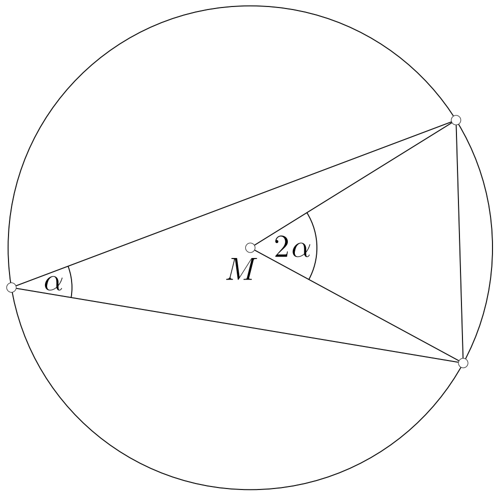


Beachte: $\quad \overset{\frown}{A''B''} = \overset{\frown}{AB} = \overset{\frown}{A'B'}$

$$\overset{\frown}{A'A''} = \overset{\frown}{A'B''} + \overset{\frown}{A''B''}$$

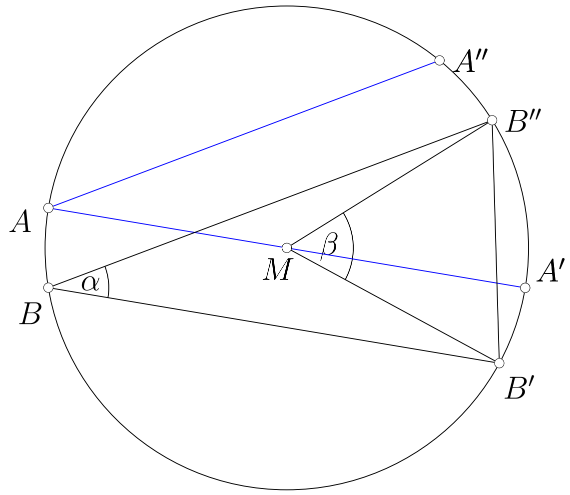
$$\overset{\frown}{B'B''} = \overset{\frown}{A'B''} + \overset{\frown}{A'B'}$$

f) Der Mittelpunktswinkel ist doppelt so groß wie der Peripheriewinkel.
Begründung



Sei $\overline{AA'} \parallel \overline{BB'}$, $M \in \overline{AA'}$ und $\overset{\frown}{A'A''} = \overset{\frown}{B'B''}$,
dann folgt $\overset{\frown}{A'B'} = \overset{\frown}{AB} = \overset{\frown}{A''A''}$
und damit $\overline{AA''} \parallel \overline{BB''}$.

Die beiden Winkel mit paarweise parallelen Schenkeln sind gleich groß.



Nach d) ist der Mittelpunktswinkel 2α,

mit e) folgt $\beta = 2\alpha$.