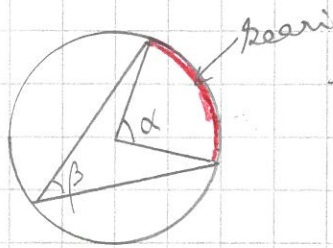


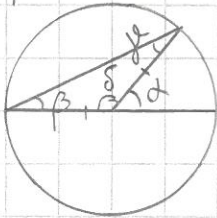
## 11. Ympyrän kehökulma ja keskuskulma



Kehökulma ( $\beta$ ) on puolet samaa kaarta vastaaavasta keskuskulmasta ( $\alpha$ )

$$\beta = \frac{\alpha}{2}$$

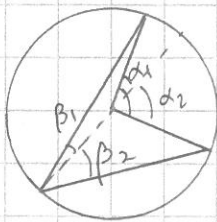
Tod. 1°



$\gamma = \beta$  (tasakylkinen kolmio, symmetria)

$$\begin{aligned} \alpha &= 180^\circ - \delta \\ &= 180^\circ - (180^\circ - \beta - \gamma) \\ &= 180^\circ - (180^\circ - 2\beta) \\ &= 2\beta \quad \checkmark \end{aligned}$$

2°

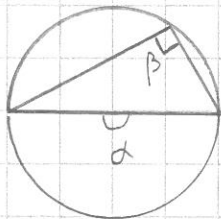


$$\alpha = \alpha_1 + \alpha_2$$

$$\beta = \beta_1 + \beta_2$$

$$\alpha = \alpha_1 + \alpha_2 \stackrel{1^\circ}{=} 2\beta_1 + 2\beta_2 = 2(\beta_1 + \beta_2) = 2\beta \quad \checkmark$$

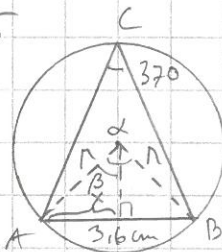
3° ?



$$\beta = \frac{\alpha}{2} = \frac{180^\circ}{2} = 90^\circ$$

Sis: puoliympyrän kehökulma  $\alpha$  on suorakulma.

11.5



$$\alpha = 2 \cdot 37^\circ = 74^\circ$$

$$x = \frac{3.6 \text{ cm}}{2} = 1.8 \text{ cm}$$

$$\beta = \frac{\alpha}{2} = 37^\circ$$

} tasakylkinen kolmio (symmetria)

$$\sin \beta = \frac{x}{r} \quad | \cdot \frac{r}{\sin \beta}$$

$$\Rightarrow r = \frac{x}{\sin \beta} = \frac{1.8 \text{ cm}}{\sin 37^\circ} = 2.991 \text{ cm} \approx \underline{\underline{3.0 \text{ cm}}}$$