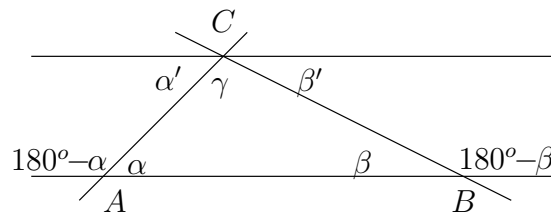


## Assignment 2

### Oral questions

- 2.4/12
- Complete the following proof of the theorem stating that the sum of the angles of a triangle  $ABC$  is  $180^\circ$ . We draw parallel line to  $AB$  through  $C$  and use the notation introduced in the picture.



Applying Euclid's fifth postulate to the line  $AC$  and the angles  $180^\circ - \alpha$  and  $\alpha'$  yields  $180^\circ - \alpha + \alpha' \geq 180^\circ$ . As a consequence we must have  $\alpha' \geq \alpha$ . Similarly, applying Euclid's fifth postulate to the line  $BC$  and the angles  $180^\circ - \beta$  and  $\beta'$  yields  $180^\circ - \beta + \beta' \geq 180^\circ$ , and so  $\beta' \geq \beta$ . Hence we obtain

$$\alpha + \beta + \gamma \leq \alpha' + \beta' + \gamma \leq 180^\circ.$$

Use Euclid's fifth postulate directly in two more situations to show that  $\alpha + \beta + \gamma$  is also greater than equal to  $180^\circ$ .

### Questions to be answered in writing

- 2.2/4
- 2.3/6