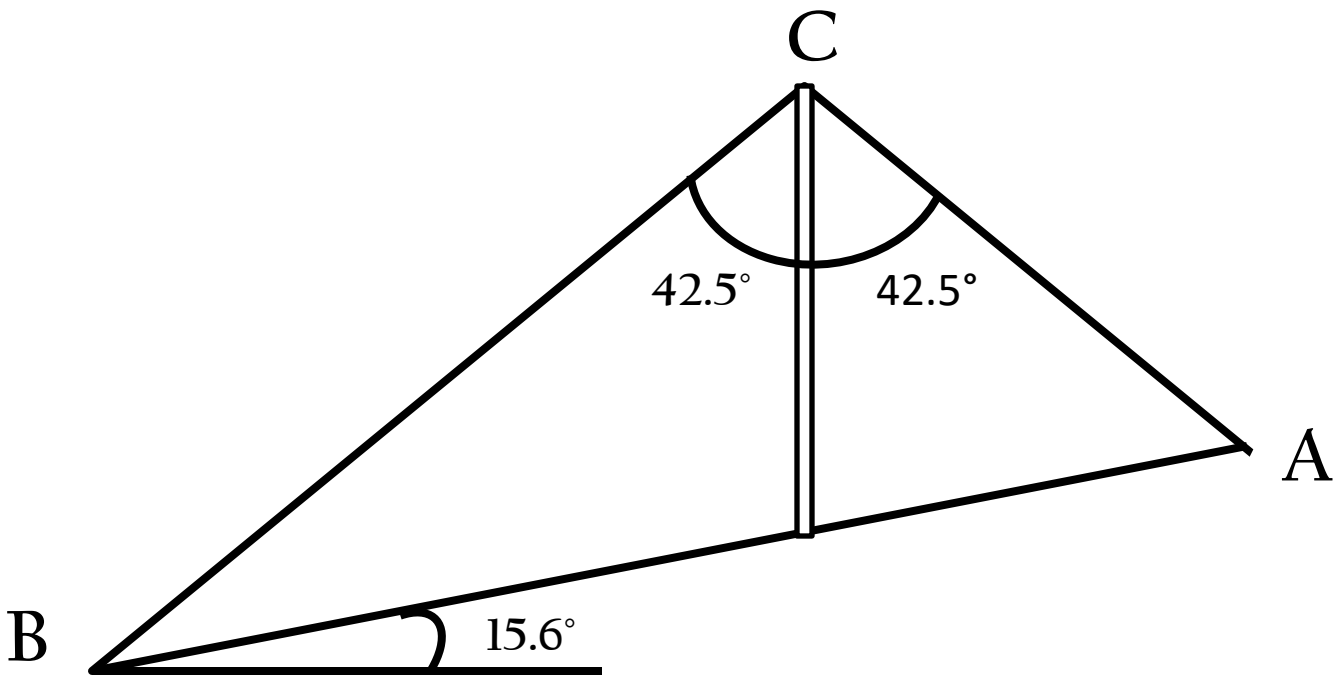
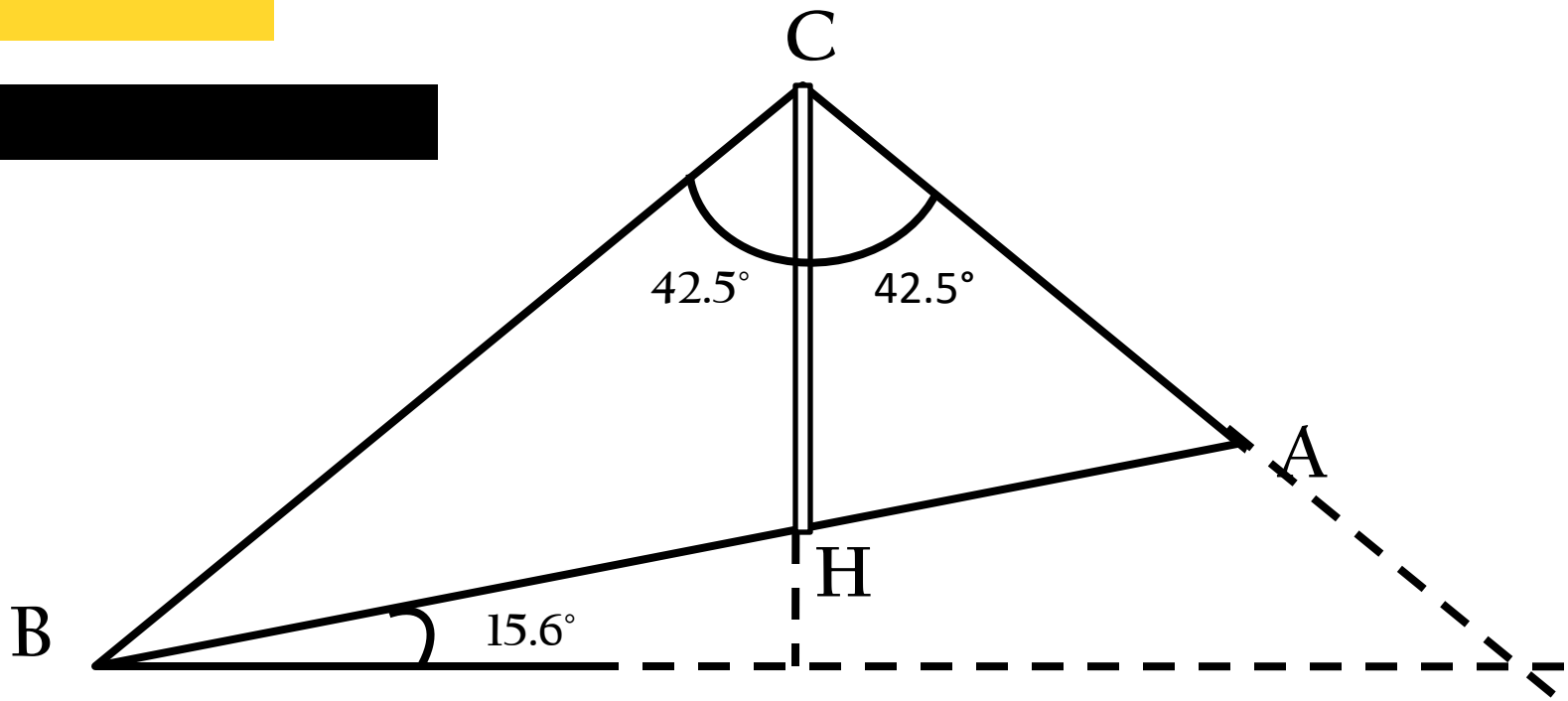
BROZZI
CHIAPPINO
D'ETTORRE
DI CARLO
GIAMMARINO
MELCHIORRE

THE LAW OF SINES

A 71.6-m-high antenna mast is to placed on sloping ground with the cables making an angle of 42.5° with the top of the mast. Find the land of each cable.





Let's imagine to extend the sides of the triangle to create an isosceles triangle.
We can divide this new triangle in two right triangles extending CH.

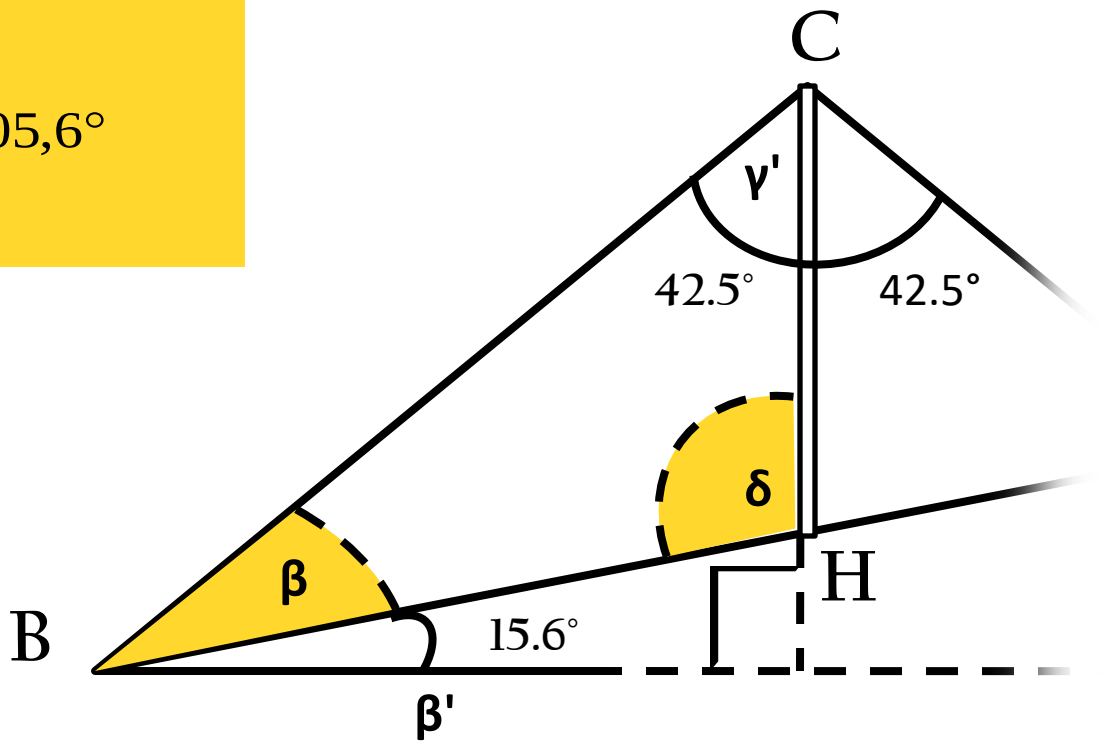
Now we can find the angle **β**:

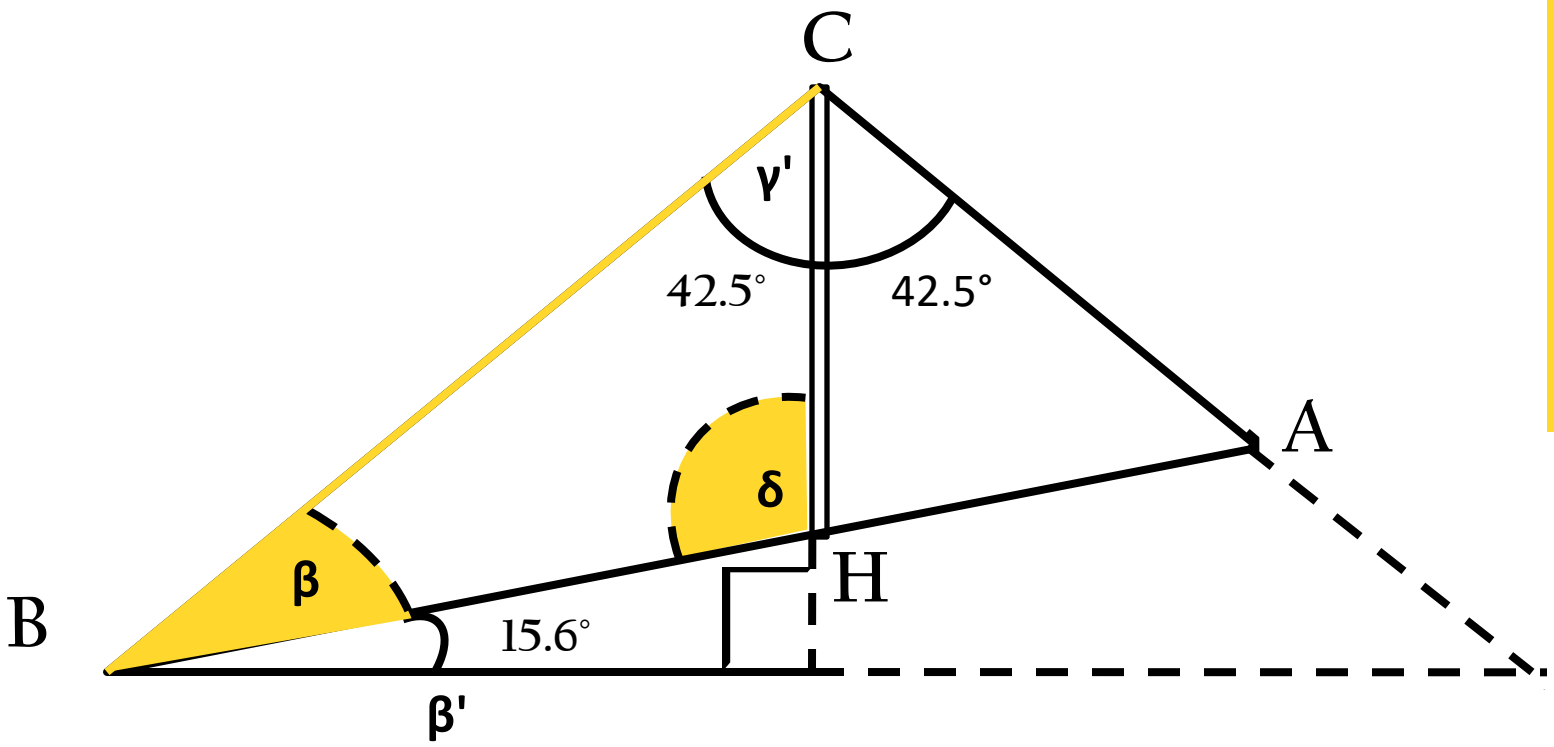
$$(\beta + \beta') = 180° - (\gamma' + 90°) = 47{,}5°$$

$$\beta = (\beta + \beta') - \beta' = 31{,}9°$$

With the same process we can find the angle **δ**:

$$\delta = 180° - \gamma' - \beta = 105{,}6°$$





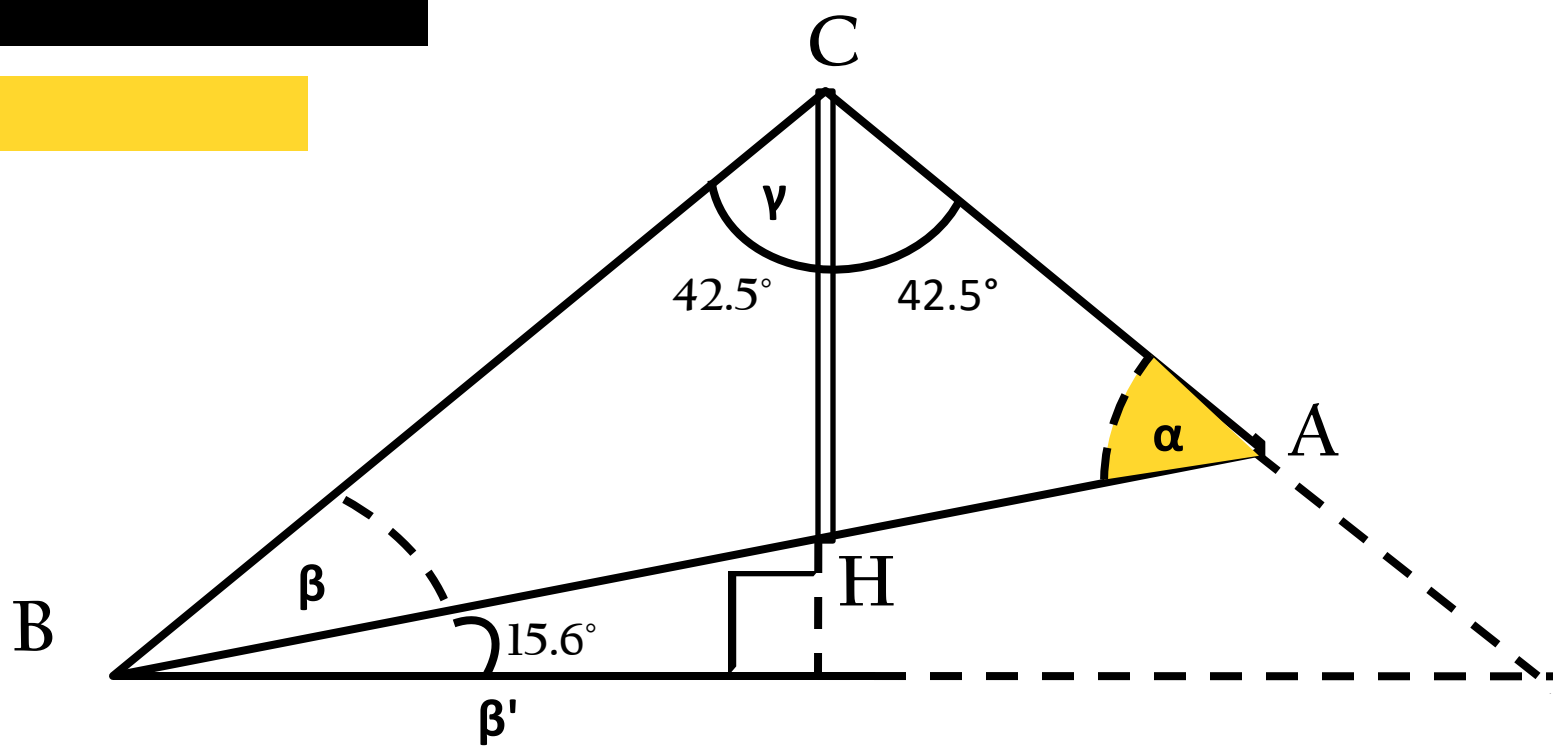
Now, using the Law of Sines, we can find the side CB:

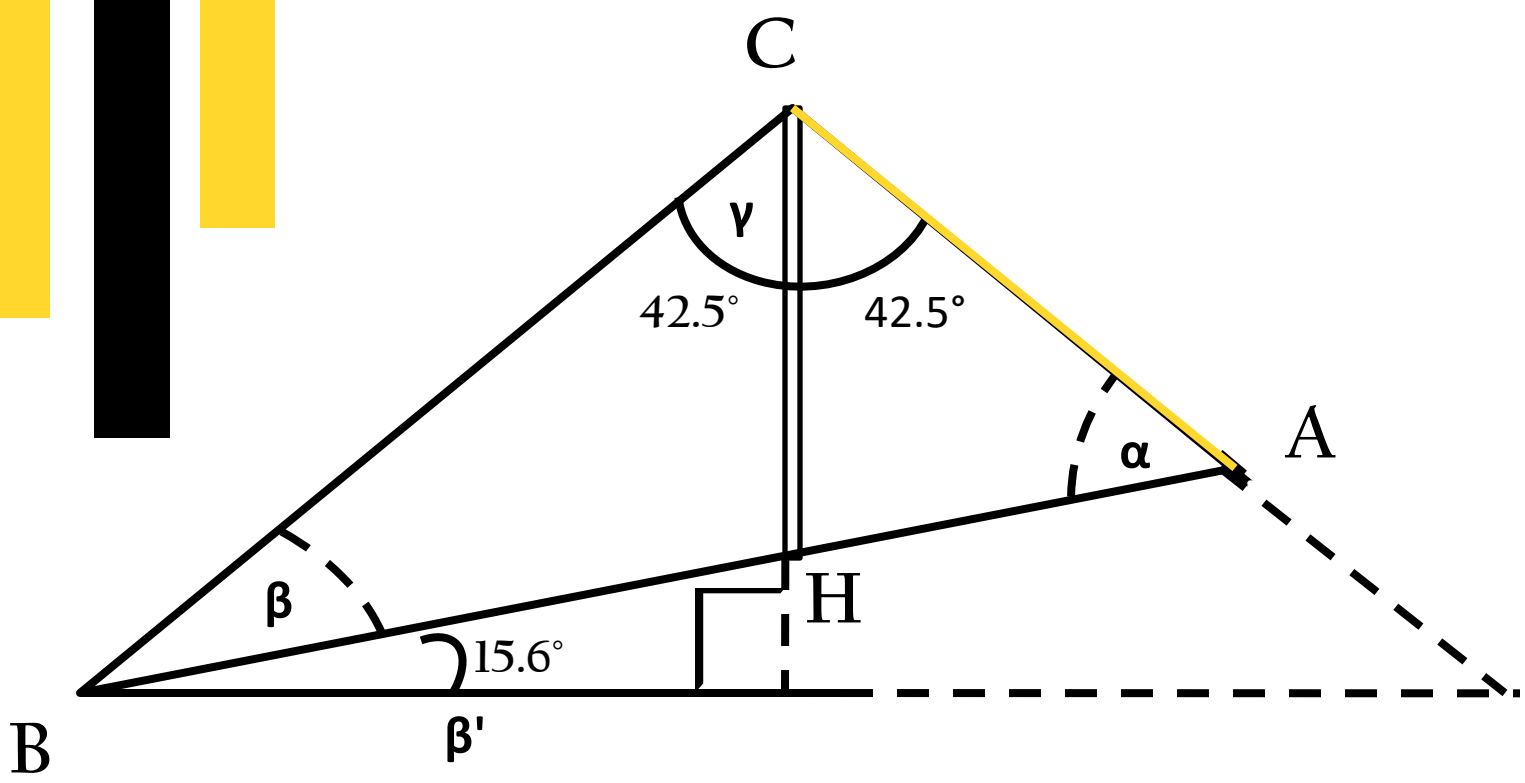
$$\frac{CH}{sen\beta} = \frac{CB}{sen\delta} \Rightarrow CB = CH\,\frac{sen\delta}{sen\beta} \Rightarrow CB = 71{,}6\,\frac{0{,}96}{0{,}53} = 130cm$$

As we know the angles **β** and **γ**, we can find **α**:

$$\alpha = 180° - \beta - \gamma$$

$$\alpha = 180° - 31{,}9° - 85° = 63{,}1°$$





Last but not least, we can find CA using the Law of the Sines:

$$\frac{CA}{sen\beta} = \frac{CB}{sen\alpha} \Rightarrow CA = CB\frac{sen\beta}{sen\alpha} \Rightarrow CA = 130\frac{0{,}53}{0{,}89} = 77{,}4cm$$