This is an alternative solution to the question originally asked by Catriona Agg at X
https://x.com/Cshearer41/status/1493870019318632451 **Two quarter circles. What's the angle?**

The challenge here is to provide a fresh solution by just using geometry, not even cyclic quads since they have already been presented as a solution.

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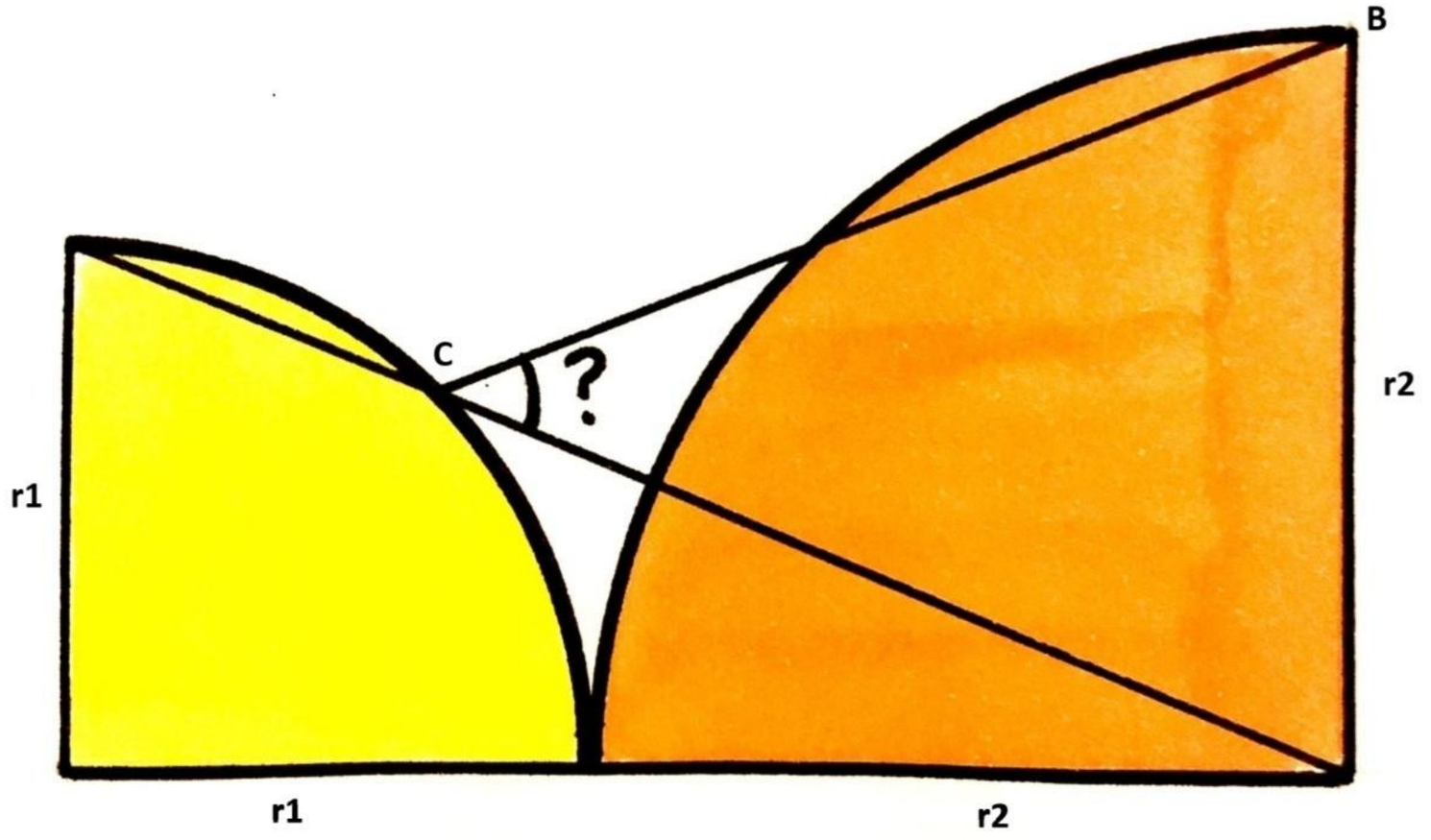
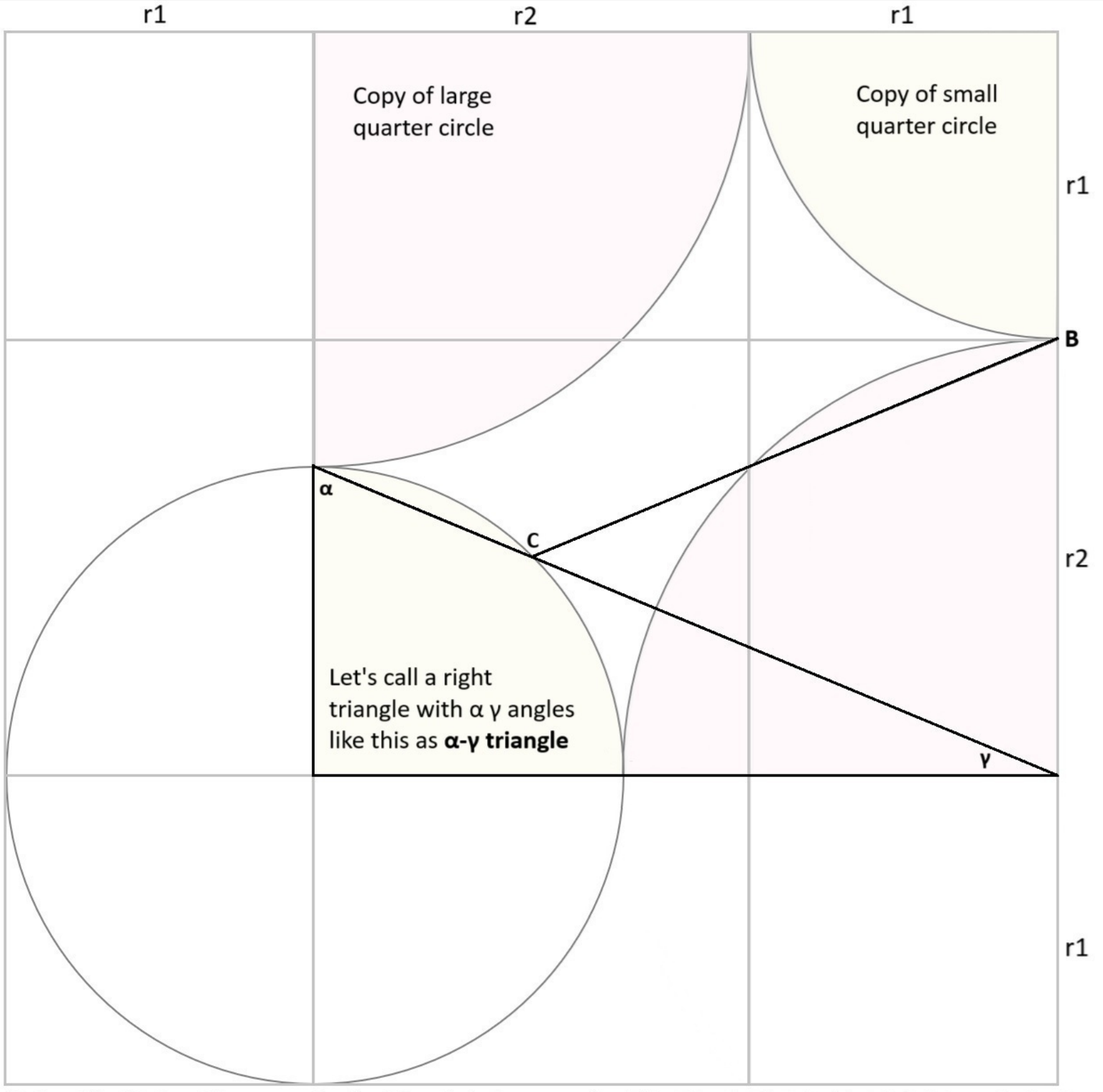
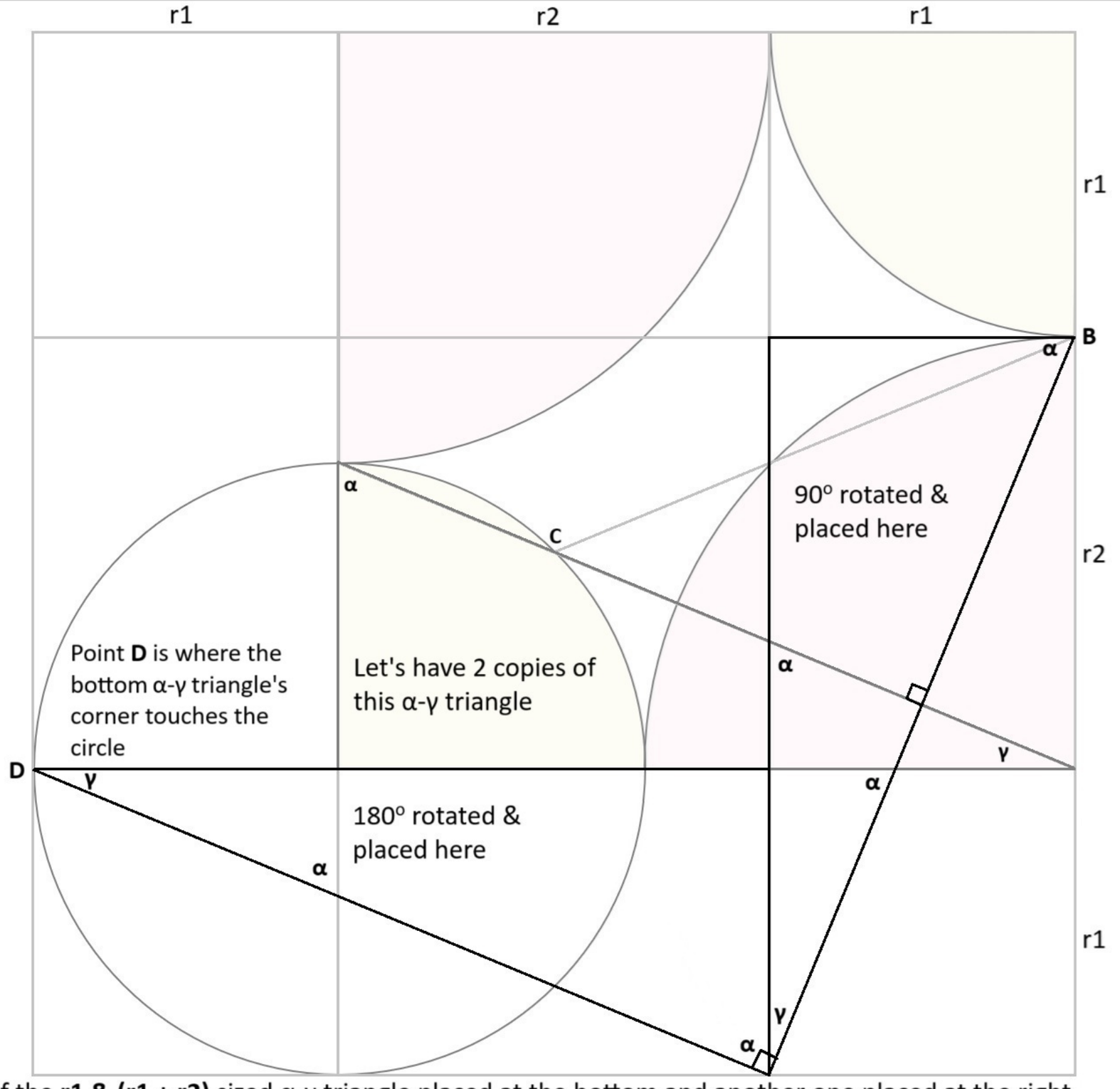
(Not a mathematician, just a hobbyist who likes solving geometric problems. I have never communicated my solutions with anyone before, not on Internet or anywhere. But since this question was so fascinating and I spend many days to solve it, I had to. So, this is my first communication for solving a geometric problem)

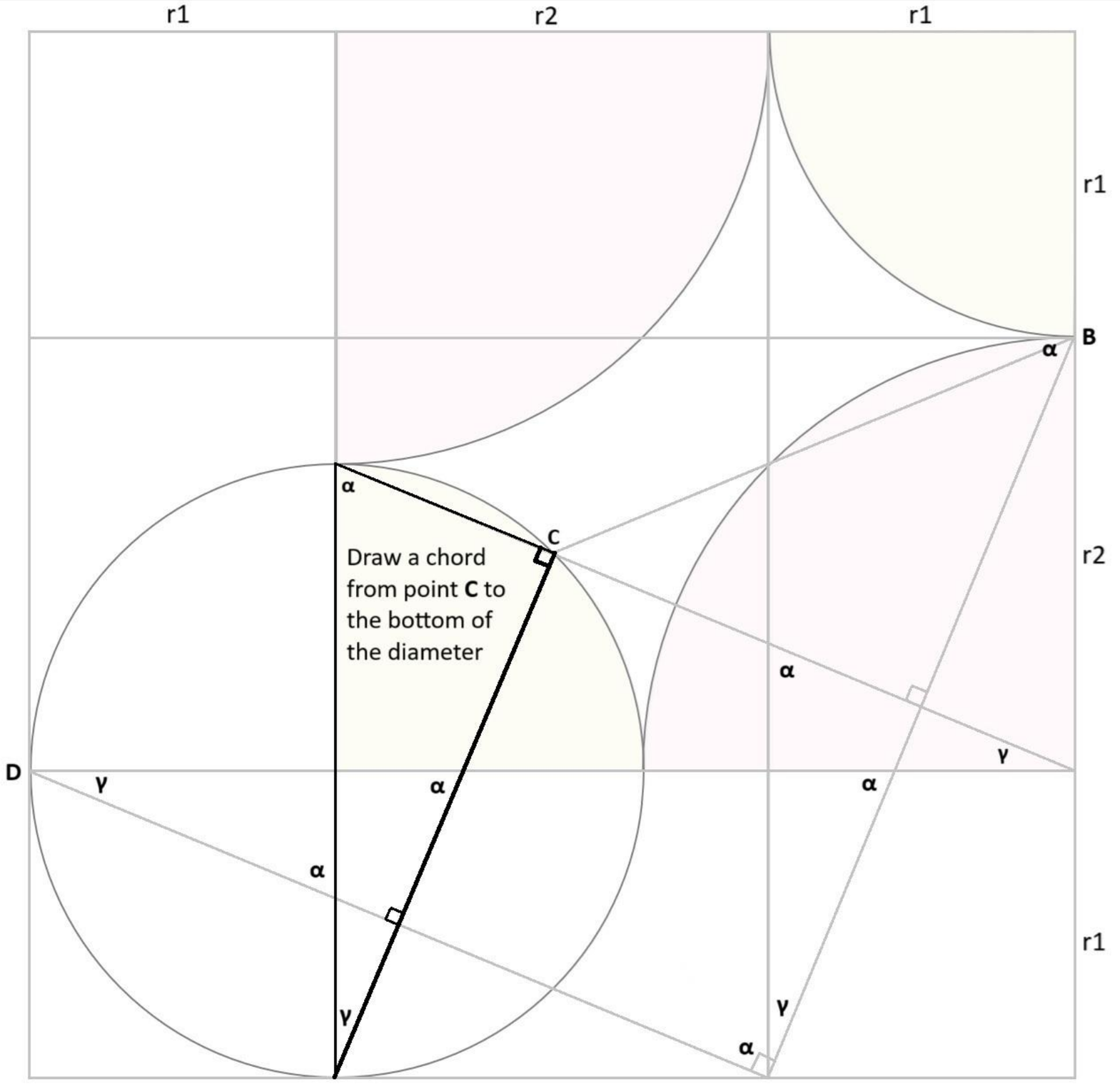




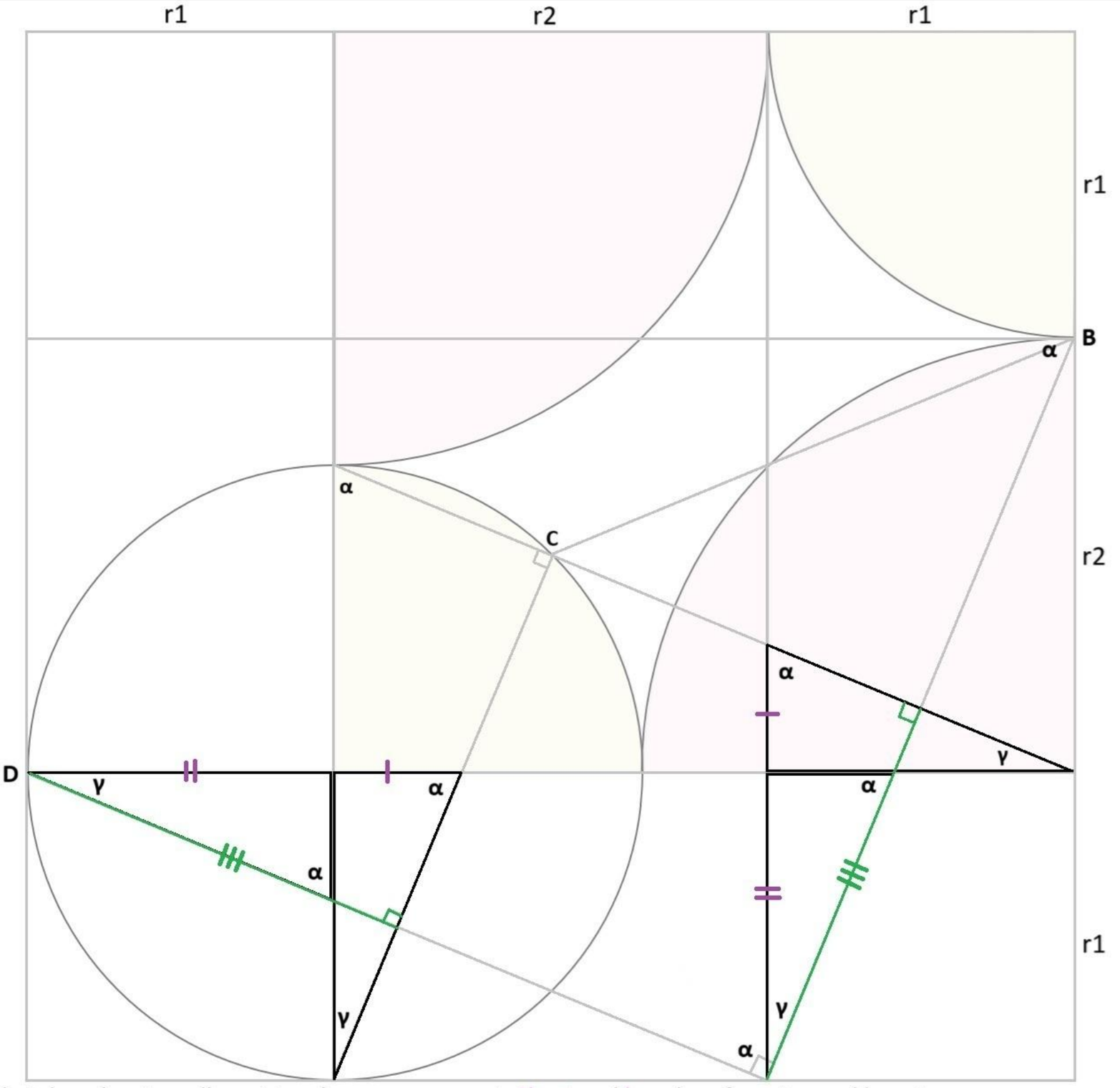
Let's construct **(2r1+ r2) x (2r1 + r2)** square sized grid and observe newly defined α-γ triangle has **r1 & (r2 + r1)** size legs



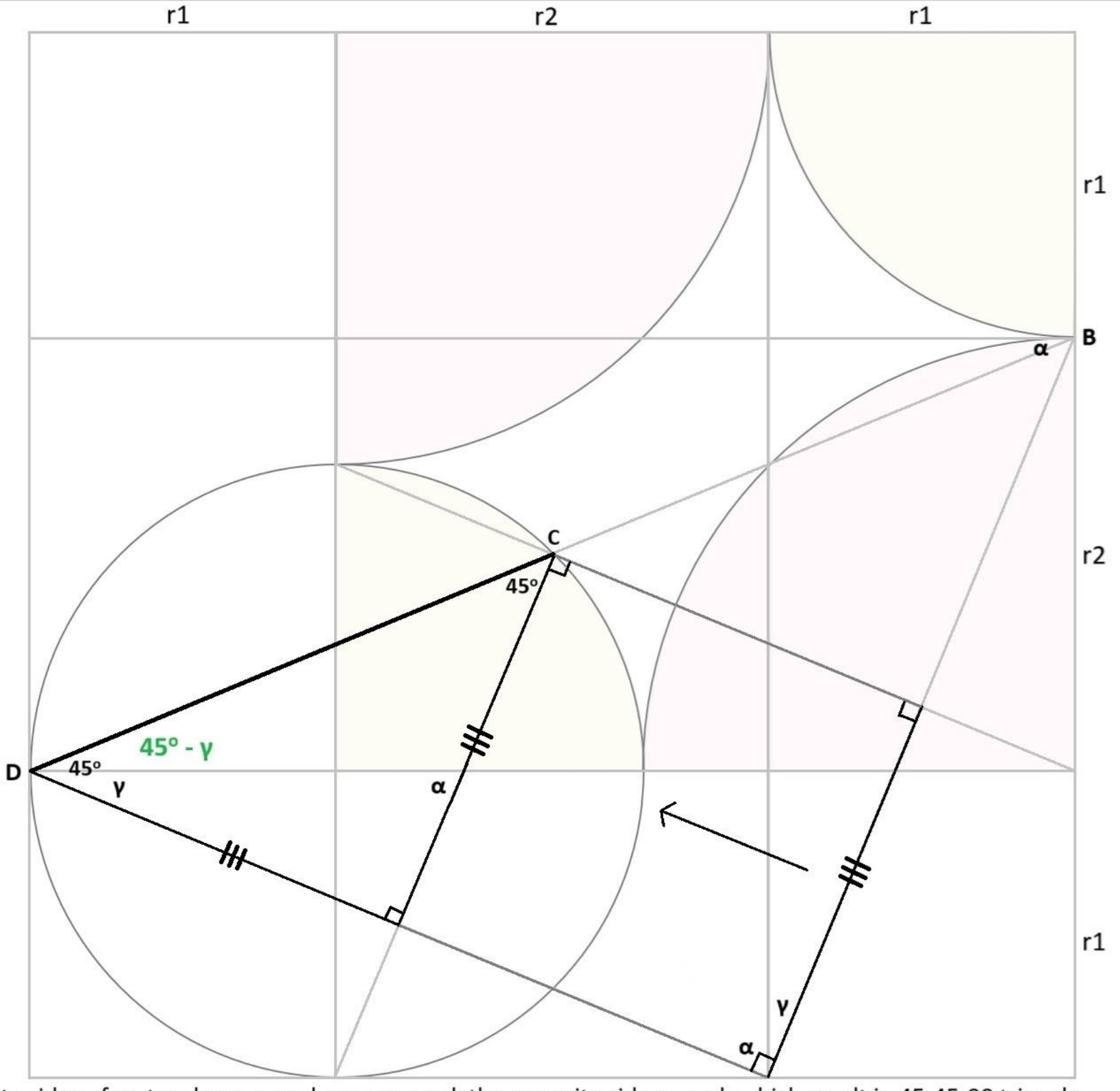
One copy of the **r1 & (r1 + r2)** sized α-γ triangle placed at the bottom and another one placed at the right.
Now we have three congruent α-γ triangles along with three equal hypotenuses and new point **D**



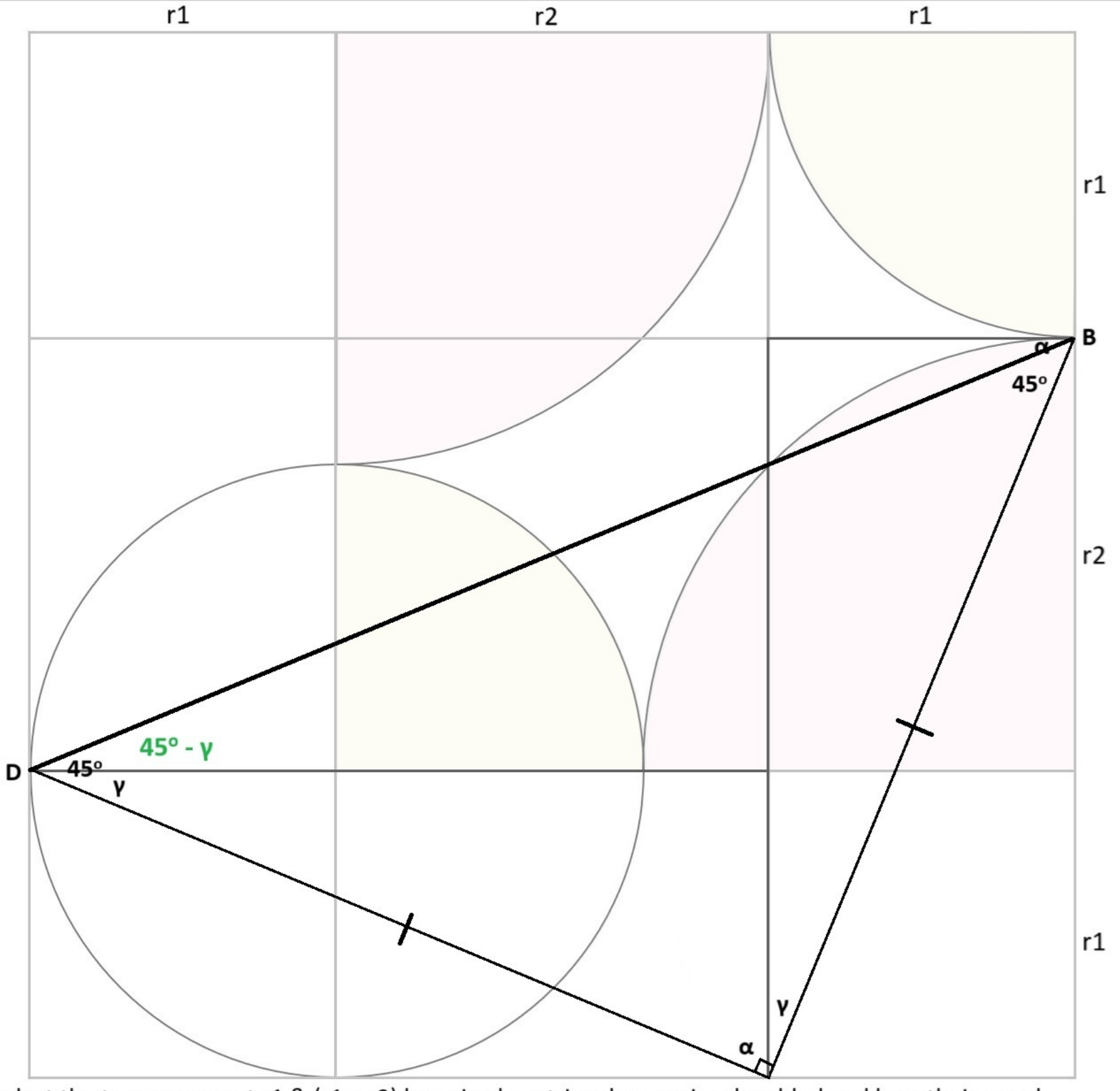
Inscribed angle on semicircle is always 90°



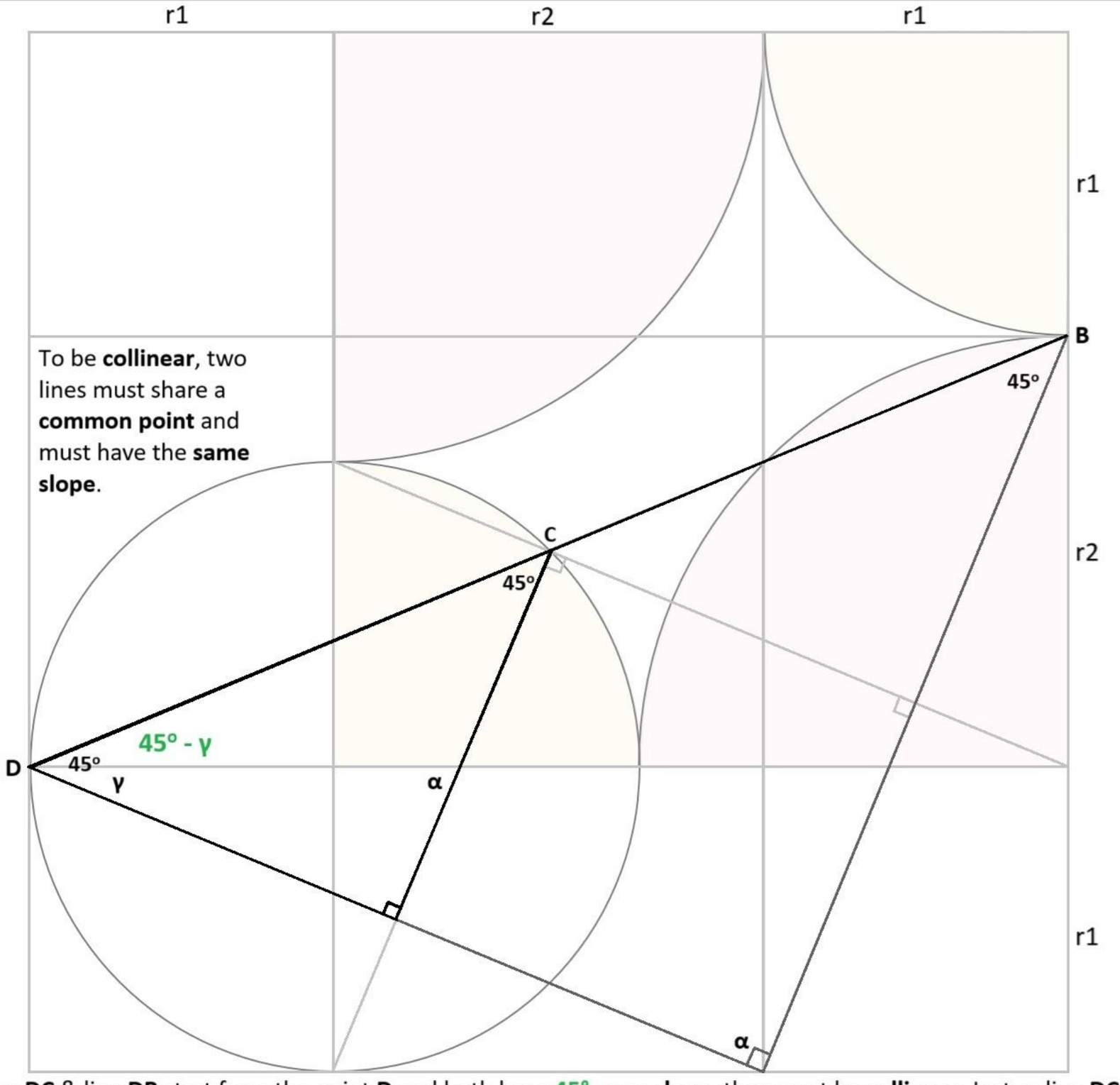
Having **r1** as their long leg 4 small α-γ triangles are congruent. Short and long legs form 2 equal hypotenuses of larger 2 congruent α-γ triangles with also equal 2 long legs, one on left and one on right .



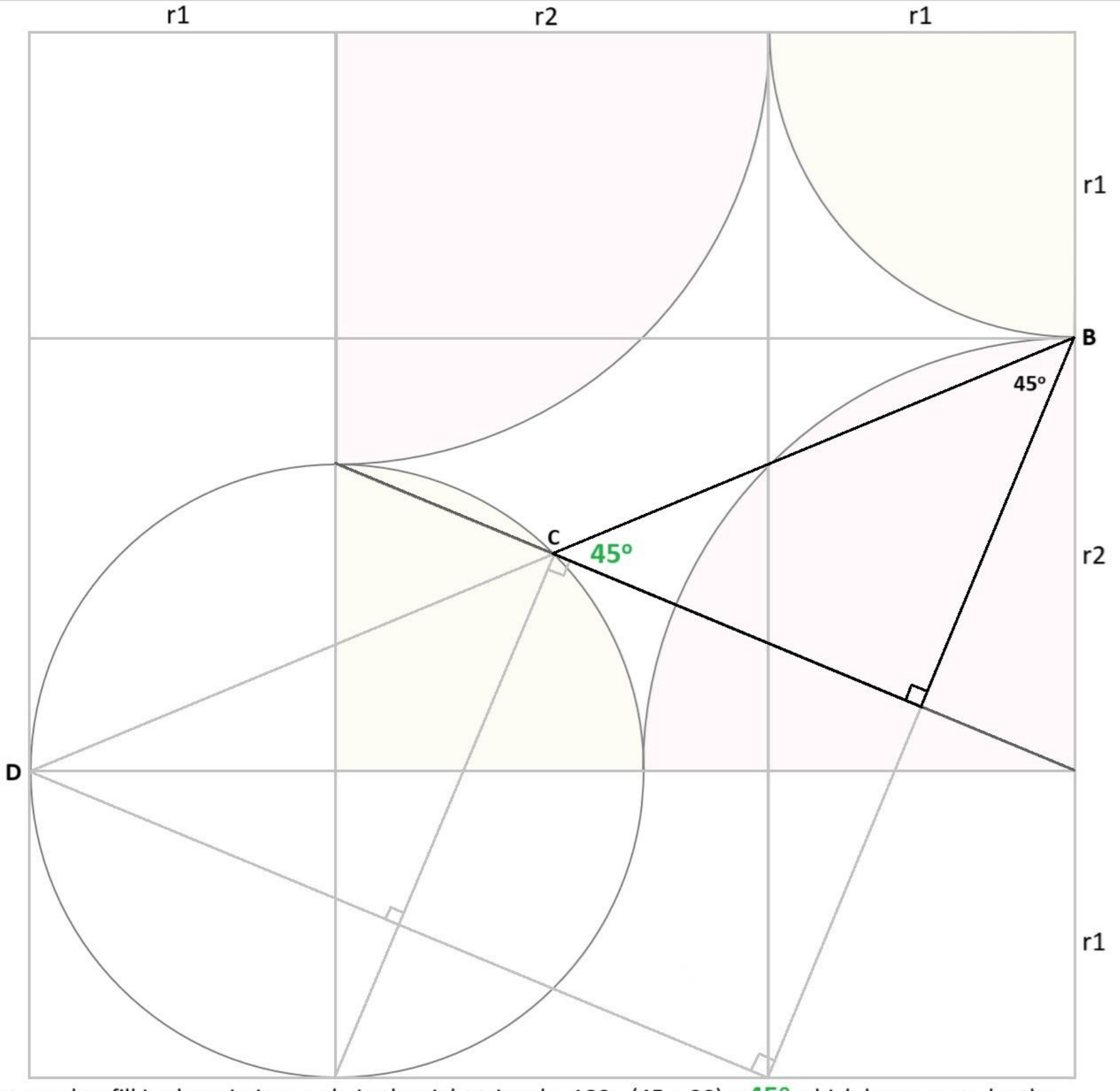
Since opposite sides of rectangle are equal, we can mark the opposite side as such which result in 45-45-90 triangle where line **DC** is the hypotenuse with **45° - γ** as **slope**



Now, let's look at the two congruent r1 & (r1 + r2) legs sized a-γ triangles previously added and how their equal hypotenuses create a 45-45-90 triangle where line **DB** is the hypotenuse with 45° - γ as **slope**



Since both line **DC** & line **DB** start from the point **D** and both have **45° - γ** as **slope**, they must be **collinear**. Just as line **DC** touches the point **C**, line **DB** must also touch the point **C**. Therefore line **DCB** must be a **straight** line.



Finally, we just need to fill in the missing angle in the right triangle. 180 - (45 + 90) = **45°** which happens to be the answer to the originally asked question.