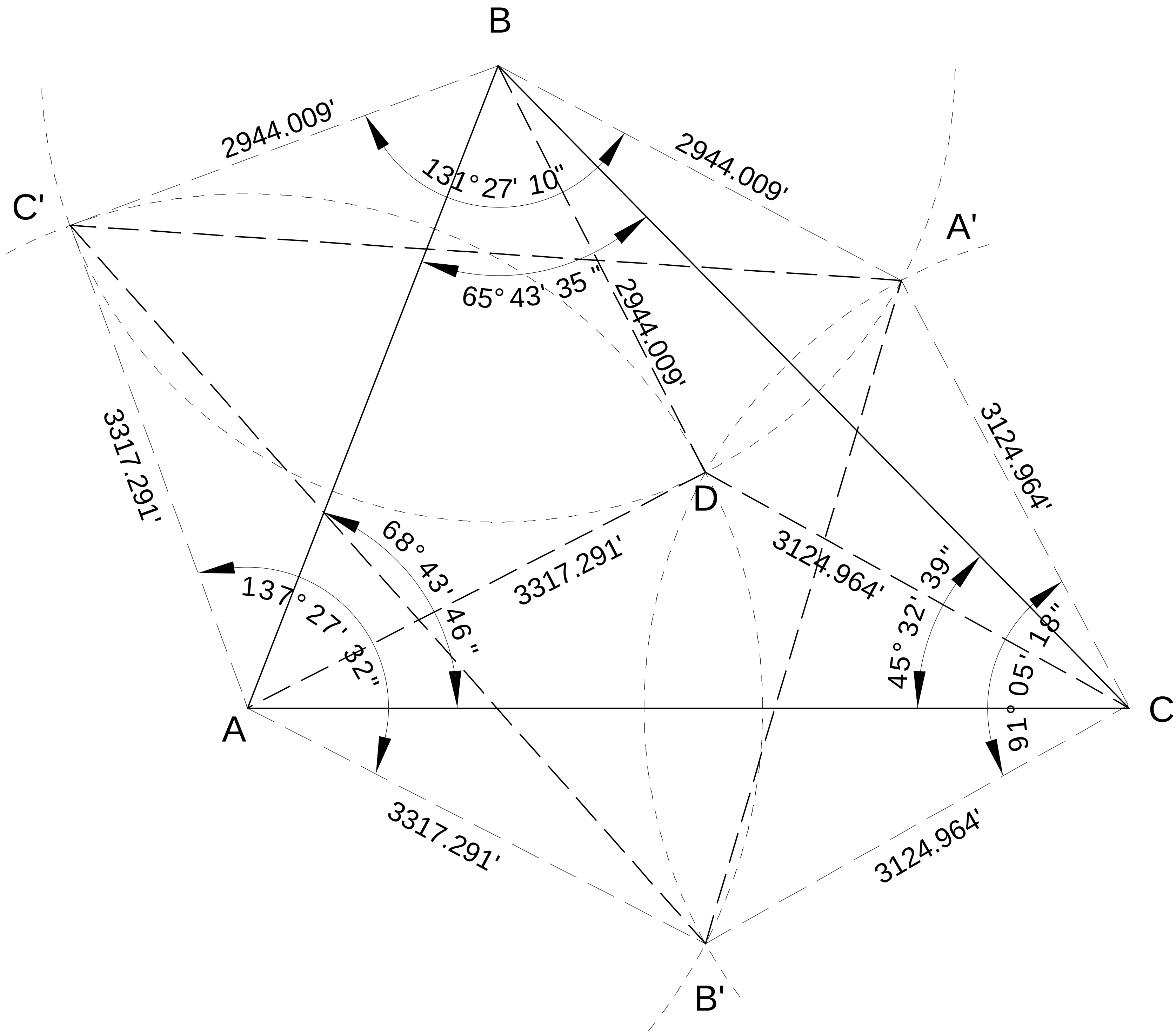

B
C'
A'
D
A
C
B'
2944.009'
2944.009'
2944.009'
131° 27' 10"
65° 43' 35"
3317.291'
3317.291'
3317.291'
3124.964'
3124.964'
3124.964'
68° 43' 46"
137° 27' 32"
45° 32' 39"
91° 05' 18"

New2Ans

First, turn the problem "inside-out" by constructing points C', A', and B' using points A, B, and C as radius points and distances AD, BD, and CD as radii. Angle C'-A-B is the same as angle B-A-D, whatever it is. Angle B'-A-C is the same as angle D-A-C also, so angle C'-A-B' is twice angle B-A-C. The same is true for angle B'-C-A' being equal to twice angle A-C-B and angle A'-B-C' being equal to twice angle A-B-C.

In triangle C'-A-B', angles A-C'-B' and A-B'-C' equal ½(180°–137°27'32"), or 21°16'14",

so side C'-B' can be solved by: (2)(3317.291)cos21°16'14"=6182.620.

Triangle B'-C-A' can likewise by solved for side B'-A' by (2)(3124.964)cos44°27'21" = 4461.139, and triangle C'-B-A' can be solved for side C'-A' by (2)(2944.009)cos24°16'25" = 5367.474.

The angles of triangle C'-A'-B' can then be solved by the Law of Cosines:

$$angle\ A'C'B' = arccos\frac{5367.474^2+6182.620^2-4461.139^2}{(2)(5367.474)(6182.620)} = 44°45'10"$$

$$angle\ C'A'B' = arccos\frac{5367.474^2+4461.139^2-6182.62^2}{(2)(5367.474)(4461.139)} = 77°21'04"$$

$$\text{angle}\ C'B'A' = arccos\frac{4461.139+6182.620^2-5367.464^2}{(2)(4461.139)(6182.620)} = 57°53'46"$$

Angle A-C'-B = 21°16'14" + 44°45'10" + 24°16'25" = 90°17'49" and side AB can be computed by the Law of Cosines:

$AB^2 = 3317.291^2 + 2944.009^2 – (2)(3317.291)(2944.009)cos90°17'49" = 4446.666^2$

Angle B-A'-C = 24°16'25" + 77°21'04" + 44°27'21" = 91°05'18" and side BC can also be computed by the Law of Cosines:

$BC^2 = 2944.009^2 + 3124.964^2 – (2)(2944.009)(3124.964)cos91°05'18" = 5805.274^2$

and for side AC, angle A-B'-C = 21°16'14" + 57°53'46" + 44°27'21" = 123°37'21" and

$AC^2 = 3317.291^2 + 3124.964^2 – (2)(3317.291)(3124.964)cos\ 123°37'21" = 5678.906^2$