Construct BH equal to and parallel with EC.

Construct GH equal to and parallel with AD.

The area of triangle BHG = area of triangle BDG + area triangle GDH + area triangle BDH.

Area of BDH = area EDC = ¼ area triangle ABC.

Area of GDH = area ADG = ¼ area triangle ABC.

Area of BDG = ¼ area of triangle ABC.

Area of BHG = ¾ area of ABC.

Area of ABC = 4/3 area of BHG.

Area of ABC = $\frac{4}{3}\sqrt{m(m-d)(m-e)(m-f)}$, where $m = \frac{d+e+f}{2}$

For the triangle sides:

$\overline{AQ}^2 = \overline{AG}^2 + \overline{GQ}^2 - 2 \cdot \overline{AG} \cdot \overline{GQ} \cdot \cos\phi$ .... (1)

$\overline{QC}^2 = \overline{GC}^2 + \overline{GQ}^2 - 2 \cdot \overline{CG} \cdot \overline{GQ} \cdot \cos(180^\circ - \phi)$ .... (2)

$\cos(180^\circ - \phi) = -\cos\phi$ and AG = GC

Expanding and adding (1) & (2),

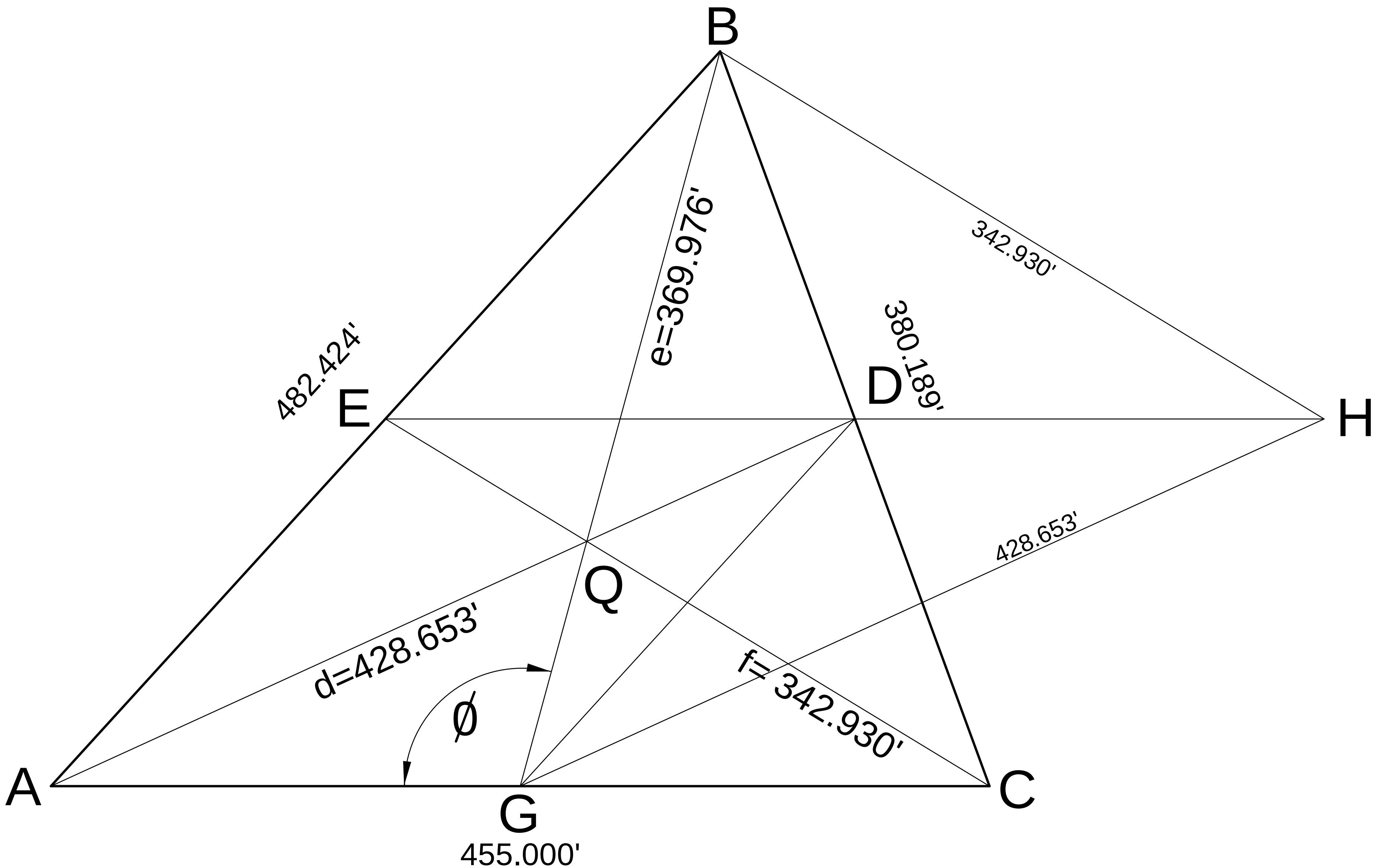
$\overline{AQ}^2 + \overline{QC}^2 = \overline{AG}^2 + \overline{GC}^2 + 2 \cdot \overline{GQ}^2$, or $\overline{AQ}^2 + \overline{QC}^2 = 2 \cdot \overline{AG}^2 + 2 \cdot \overline{GQ}^2$

But $AQ = \frac{2}{3} \cdot AD, CQ = \frac{2}{3} \cdot CE, and\ GQ = \frac{1}{3} \cdot GB$

$[(2/3)(428.653)]^2 + [(2/3)(342.930)]^2 = (2) \cdot \overline{AG}^2 + (2)[(1/3)(369.976)]^2$

From which AG = 227.500 and AC = 455.000

Likewise, AB = 482.424 and BC = 380.189


B
E
D
H
Q
A
G
C
482.424'
e=369.976'
342.930'
380.189'
428.653'
d=428.653'
f= 342.930'
Ø
455.000'