Orrery

Angles

$$AB = \sqrt{AD^2 + BD^2} = 50.596443$$

$$\theta = \arctan(\frac{BD}{AD}) = 18.434949^\circ$$

$$2s = AB + BC + CA = 122.5964$$

$$\sin\frac{(\theta + \alpha)}{2} = \sqrt{\frac{(s - AC)(s - AB)}{AB.AC}}$$

$$\theta + \alpha = 39.2169^\circ$$

$$\sin\frac{\beta}{2} = \sqrt{\frac{(s - CA)(s - CB)}{CB.CA}}$$

$$\beta = 88.5675^\circ$$

$$\alpha = 39.2169^\circ - 18.434949^\circ = 20.78195^\circ$$

$$3^2 + 4^2 = 5^2$$