



## *Special Maths Academy* *Problem Corner for May 2022*

**Instructions :** Provide well-written and well-explained solutions. Submit via  
our website: <https://specialmaths.ng/problem-corner/>

**Problem :** Given an acute  $\triangle ABC$  with Circumcircle  $\omega$  and altitudes  $AD, BE$  and  $CF$ . Let line  $AD$  meet  $\omega$  again at  $P$ . Suppose  $PF$  and  $PE$  meet  $\omega$  again at  $R, Q$  respectively. Let  $O_1$  and  $O_2$  be the circumcenters of  $\triangle BFR$  and  $\triangle CEQ$  respectively. Prove that:

1.  $|O_1E| = |O_2F|$
2. Suppose that  $O_1O_2$  intersects  $EF$  at  $J$ , prove that  $AJ \perp O_1O_2$ .

*Proposed by Ejaiife Ogheneobukome*