

Problem 6

The Lester circle is orthogonal to the Orthocentroidal Circle of the Triangle of the Orthocenters of the Triangulation Triangles of the Tarry Point.

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At the present time, there are seven notable circles known to be orthogonal to the Lester circle. See [1]. The below problem introduces a new notable circle which is orthogonal to the Lester circle.

Prove the following problem, produced by the computer program “Discoverer”:

Problem 6. Given $\triangle ABC$. The Lester circle of $\triangle ABC$ is the circle passing through the circumcenter, nine-point center and the outer Fermat point. The Tarry point P is the intersection point of the circumcircle and the line passing through the centroid and the midpoint of the circumcenter and the Lemoine (Symmedian) point. Let D , E and F are the orthocenters of triangles PBC , PCA and PAB , respectively, G is the centroid of $\triangle DEF$ and H is the orthocenter of $\triangle DEF$. Prove that the circle having as diameter the segment GH is orthogonal to the Lester circle.

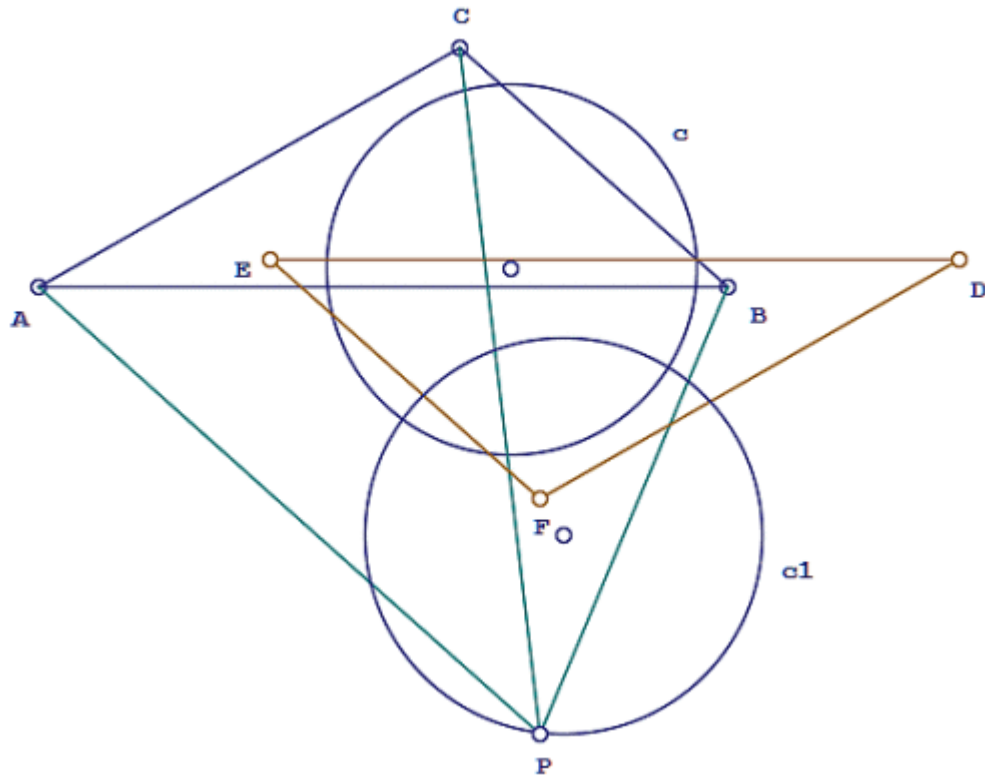
Short form of the problem:

Problem 6. Prove that the Lester circle is orthogonal to the Orthocentroidal Circle of the Triangle of the Orthocenters of the Triangulation Triangles of the Tarry Point.

The reader may find the definitions in [2-5].

Please submit the solution of the problem for publication in this journal to the editor of this journal: ddekov@ddekov.eu

See the figure:



In the figure:

c – Lester circle,

P – Tarry Point,

D – Orthocenter of Triangle PBC ,

E – Orthocenter of Triangle PCA ,

F – Orthocenter of Triangle PAB ,

c_1 – Orthocentroidal Circle of Triangle DEF ,

Circle c_1 is orthogonal to the Lester circle.

References

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2. Sava Grozdev and Deko Dekov, Computer-Generated Encyclopedia of Euclidean Geometry, 2014, available at the Web: <http://www.ddekov.eu/e2/>
3. Eric W. Weisstein, MathWorld - A Wolfram Web Resource, <http://mathworld.wolfram.com/>
4. Quim Castellsaguer, The Triangles Web, <http://www.xtec.es/~qcastell/ttw/ttweng/portada.html>
5. P. Yiu, The Circles of Lester, Evans, Parry, and Their Generalizations, Forum Geometricorum, 10 175–209.

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