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Problem 2
The Euler Reflection Point of the Triangle of the Nine-Point Centers of the Triangulation Triangles of the Tarry Point lies on the Lester circle

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At the present time there are 5 notable points known to lie on the Lester circle. These are the points X(3), X(5), X(13), X(14) and X(1117) in [1]. See e.g. [3]. The problem 2 introduces a new notable point, which lies on the Lester circle. (See also problems 1 and 3 in this journal, 2014) The new point is not available in the current edition of the Kimberling's encyclopedia [1]. (The 5549 points version of the encyclopedia of 2013).

Prove the following problem, produced by the computer program "Discoverer":

Problem 2. 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 Euler reflection point is the intersection point of the reflections of the Euler line in the sidelines *BC*, *CA* and *AB*. 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 nine-point centers of triangles *PBC*, *PCA* and *PAB*, respectively. Prove that the Euler reflection point of $\triangle DEF$ lies on the Lester circle.

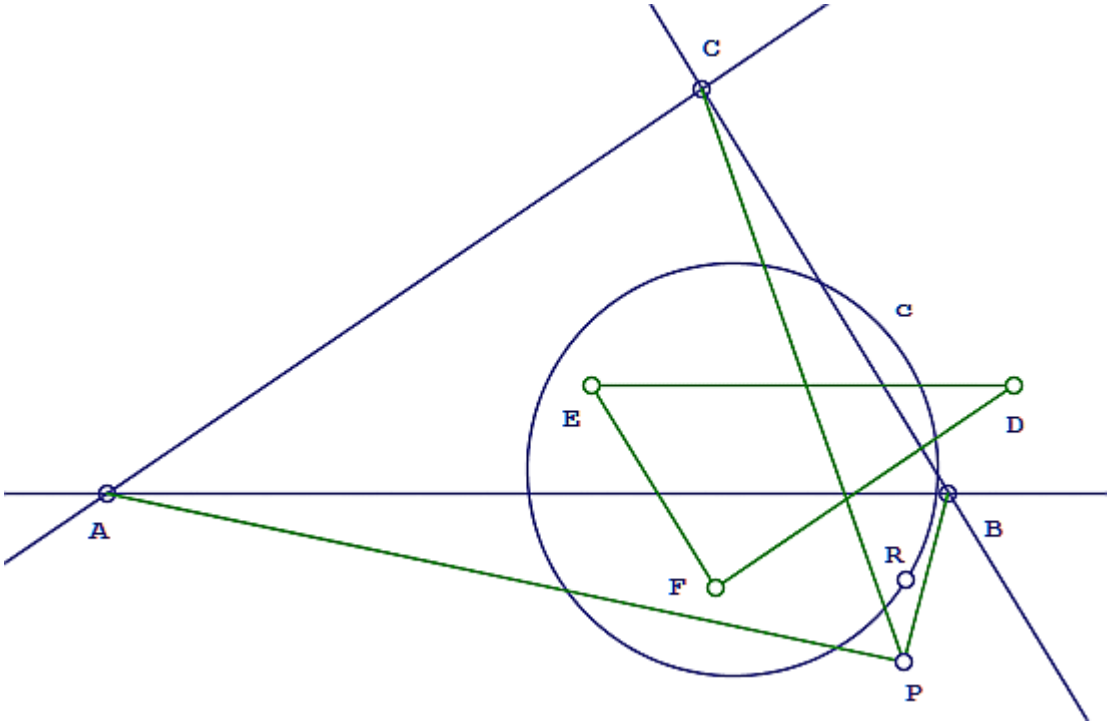
Short form of the problem:

Problem 2. Prove that the Euler Reflection Point of the Triangle of the Nine-Point Centers of the Triangulation Triangles of the Tarry Point lies on the Lester circle

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 – Nine-Point Center of triangle PBC,
E – Nine-Point Center of triangle PCA,
F – Nine-Point Center of triangle PAB,
R – Euler Reflection Point of triangle DEF lies on the Lester circle.

References

1. Clark Kimberling, Encyclopedia of Triangle Centers, http://faculty.evansville.edu/ck6/encyclopedia/ETC.html
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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