

Problem 1

The Centroid of the Triangle of Reflections of the Kiepert Center in the Sidelines of Triangle ABC 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 1 introduces a new notable point, which lies on the Lester circle. (See also problems 2 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 1. Given $\triangle ABC$ The Lester circle of $\triangle ABC$ is the circle passing through the circumcenter, nine-point center and the outer Fermat point of $\triangle ABC$. The Kiepert center of $\triangle ABC$ is the midpoint of the outer and inner Fermat points of $\triangle ABC$. Let D , E and F are the reflections of the Kiepert center in the sidelines BC , CA and AB , respectively. Prove that the centroid of $\triangle DEF$ lies on the Lester circle of $\triangle ABC$.

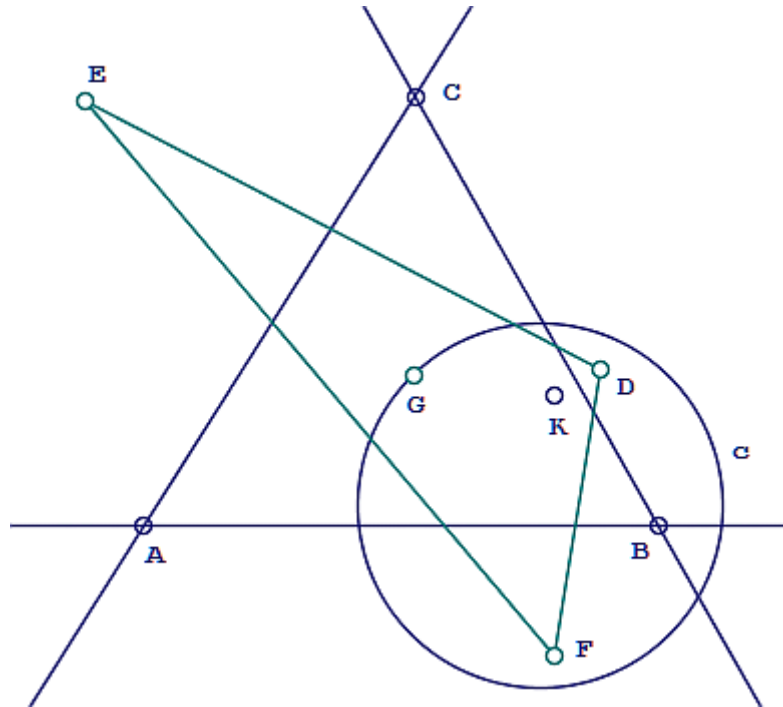
Short form of the problem:

Problem 1. Prove that the Centroid of the Triangle of Reflections of the Kiepert Center in the Sidelines of Triangle ABC 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,

K- Kiepert Center,

D – reflection of K in sideline BC,

E – reflection of K in sideline CA,

F – reflection of K in sideline AB,

G – Centroid 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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