

The Ambiguities of the Natural Language

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Abstract. The English language is ambiguous. The Machine for Questions and Answers uses the English language. We specify how to avoid the ambiguities of the English language.

The English language is ambiguous. For example, consider the statement:

Midpoint of the First Feuerbach Point and the Centroid of the Incentral Triangle.

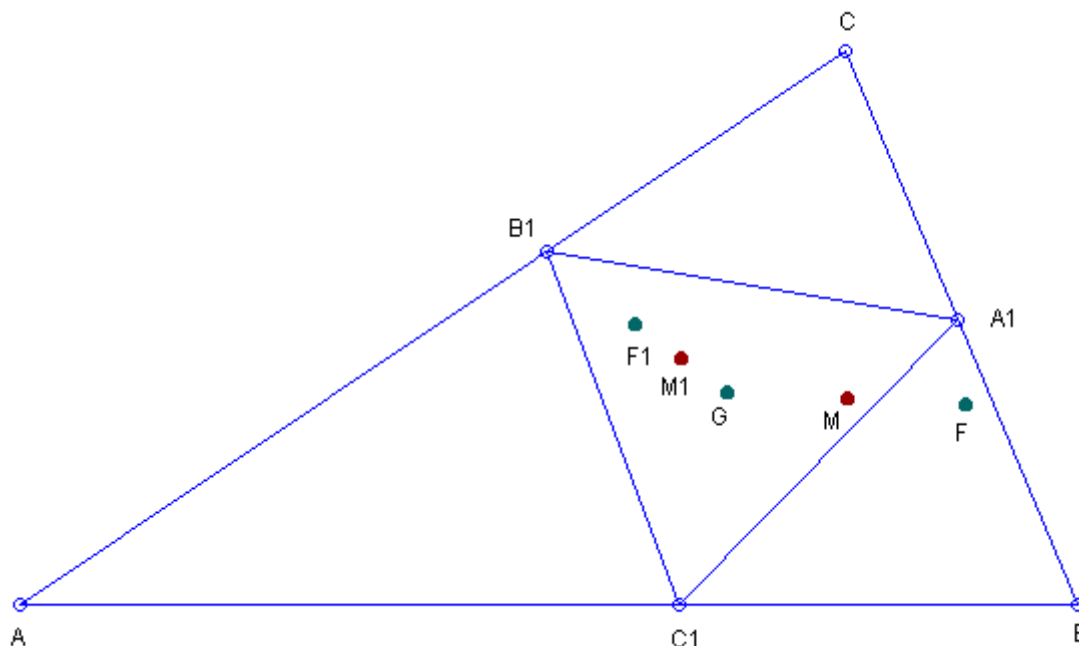
We have two cases. We distinguish the cases by using single quotation marks:

1. 'Midpoint of the First Feuerbach Point and the Centroid' of the Incentral Triangle.
2. Midpoint of the First Feuerbach Point and the 'Centroid of the Incentral Triangle'.

In the first case, we have to construct the Incentral Triangle, to construct the First Feuerbach Point and the Centroid of the Incentral Triangle, and then to construct the Midpoint of these two points.

In the second case, we have to construct the First Feuerbach Point, to construct the Incentral Triangle, to construct the the Centroid of the Incentral Triangle, and then to construct the Midpoint of these two points.

See the Figure:



- $A_1B_1C_1$ - Incentral Triangle;
- G - Centroid of the Incentral Triangle;
- F - First Feuerbach Point;
- F_1 - First Feuerbach Point of the Incentral Triangle;
- M - Midpoint between G and F;
- M_1 - Midpoint between G and F_1 .

We see that the above two cases describe two different points. Hence, the statement "Midpoint of the First Feuerbach Point and the Centroid of the Incentral Triangle" is ambiguous.

Additional Examples of ambiguous statements:

- Reflection of the Incenter in the Centroid of the Incentral Triangle.
- Product of the Incenter and the Centroid of the Incentral Triangle.
- External Center of Similitude of the Incircle and the Circumcircle of the Incentral Triangle.
- Perspector of the Symmedial Triangle and the Excentral Triangle of the Intouch Triangle.

The Machine for Questions and Answers uses English language. In order to avoid the ambiguities, we use

- conventions;
- single quotations marks.

We use the following conventions (in order to avoid the single quotation marks): Let "Triangle Center" stands for any triangle center, "Triangle" stands for any triangle, "Circle" stands for any circle, "Line" stands for any line. Then

- In a statement, the substatement *Triangle Center of a Triangle* has to be considered

as a substatement in single quotation marks, that is, as '*Triangle Center of a Triangle*'.

- In a statement, the substatement *Triangle of a Triangle* has to be considered as a substatement in single quotation marks, that is, as '*Triangle of a Triangle*'.
- In a statement, the substatement *Circle of a Triangle* has to be considered as a substatement in single quotation marks, that is, as '*Circle of a Triangle*'.
- In a statement, the substatement *Line of a Triangle* has to be considered as a substatement in single quotation marks, that is, as '*Line of a Triangle*'.

Examples.

The statement *Midpoint of the Incenter and the Centroid of the Incentral Triangle* has to be read as *Midpoint of the Incenter and the 'Centroid of the Incentral Triangle'*.

The statement *Perspector of Triangle ABC and the Incentral Triangle of the Incentral Triangle* has to be read as *Perspector of Triangle ABC and the 'Incentral Triangle of the Incentral Triangle'*.

When it is necessary, we specify additional conventions. In a few cases we use single quotations marks instead of conventions.

Thanks

The figure in this note is produced by using the program C.a.R. (Compass and Ruler), an amazing program created by Rene Grothmann. The Grothmann' s program is available for download in the Web: [Rene Grothmann' s C.a.R.](#) It is free and open source. The reader may verify easily the statements of this paper by using C.a.R. Many thanks to Rene Grothmann for his wonderful program.

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