

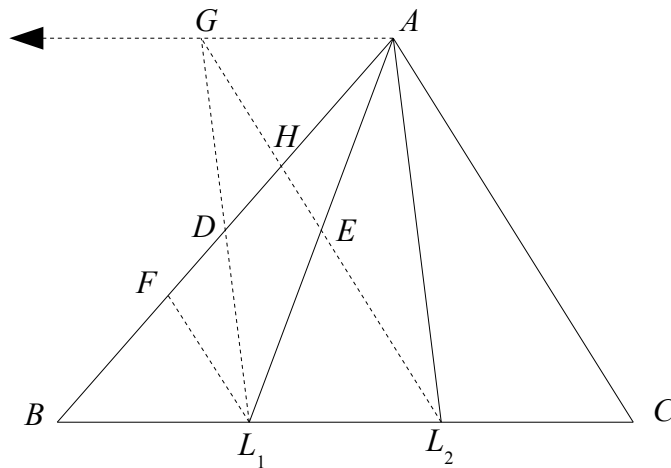
Solution to Problem 1396
The Mathematics Magazine

A Triangle Dissection

1396. *Proposed by Jiro Fukuta, Motosu-gun, Gifu-ken, Japan.*

Let ABC be an arbitrary triangle, let L_1 and L_2 be trisection points of BC , arranged in order from B to C . Describe a method for dissecting triangle ABL_1 into four parts, each of which is a triangle or a quadrilateral, so that the parts can be reassembled to form a triangle congruent to triangle AL_2C .

SOLUTION:



Through L_1 draw a line parallel to AC intersecting AB at F . Let D be the midpoint of AB . Draw a line through L_1 and D intersecting the line through A parallel to BC at point G . Draw GL_2 intersecting AL_1 at E and AB at H . The four pieces are $\triangle AHE$, $\triangle DFL_1$, $\triangle BFL_1$, and quadrilateral $DHEL_1$.

The reassembly is as follows. With point D as center, rotate $\triangle BDL_1$ through 180° (point B ends up coincident with point A). Now rotate $\triangle GEL_1$ through 180° using point E as a center (point G ends up on L_2). The four original pieces are now lying on $\triangle GAL_2$. It is an easy exercise to show that this triangle is congruent to $\triangle CL_2A$.