TRIANGLE INSCRIBED IN RECTANGLE

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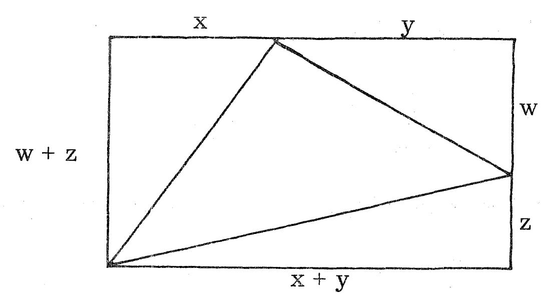
Arising from a problem proposed recently by Ben Cohen in a letter to myself, yet another example of the famous Golden Section has been revealed.

The problem was:

Within a given rectangle, inscribe a triangle such that the remainder of the rectangle will comprise three triangles of equal area.



Referring to the figure above, we have:

$$xw = yz, \text{ and } x = yw/(w + z),$$

whence

$$z^2 + zw - w^2 = 0, \text{ so } 2z = w(\sqrt{5} - 1).$$

Then,

$$2x = y(\sqrt{5} - 1).$$

So, as a necessary condition to meet the requirements, we have:

$$\frac{y}{x} = \frac{w}{z} = \frac{2}{\sqrt{5} - 1} = \frac{\sqrt{5} + 1}{2},$$

the Golden Section.