Math Diversion Problem 812

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Source:  https://www.youtube.com/watch?v=-tqcf36BWO0
Title:  99% Students FAILED to Solve this Math Problem
 Presenter:  Lines & Logic
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1 Problem

Displayed below is a rectangle inscribed within a right triangle. Find the area of the rectangle.

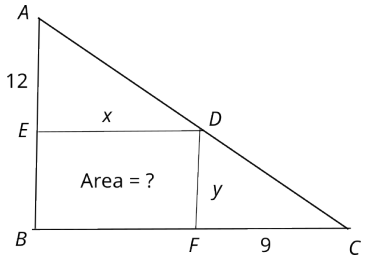

Figure 1. With so many right triangles running around, you might suppose that the Pythagorean Theorem will be most useful here. But not this time.

2 Solution

Obviously, the area A of the inscribed rectangle is $A = xy$. The simplest way to proceed is to note that $\triangle AED$ is similar to $\triangle DFC$. And as is true for similar figures, the ratios of corresponding segments are equal. From this fact we get that

$$\frac{12}{x} = \frac{y}{9}\,, \tag{1}$$

and this is easily solved for xy:

$$A = xy = 12 \times 9 = 108\,. \tag{2}$$