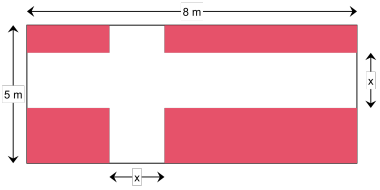
A Flag With A Cross

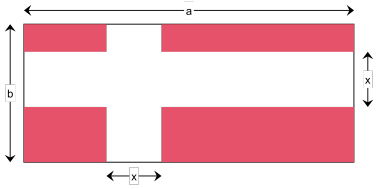
The original exercise

Consider a huge red flag which is a rectangle of 5m by 8m. We'd like to paint a white cross on it so that the area of this cross is equal to the red area which is left. Let x be the width of the cross. What are the possible values of x ?



1. Turn this problem into a mathematical equation.
2. Solve this equation and answer the question.
3. Criticize the exercise : what is the most displeasing with it ?

Turning it into something more educational



Now, let's call a and b the width and the height of the flag. How must we choose a and b so that x is a decimal number and not an irrational one ?

1. Do the same as before but use a and b instead of 5 and 8 and get an equation.
2. Find a "famous" property involving a and b which, when satisfied, produce a decimal solution for x.
3. How can one find such couples $(a; b)$?