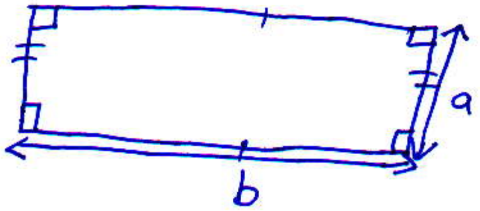
Niharika Paul Can they Be Equal? Age 9



A is the set of all a.
B is the set of all b.

I know that:

$$ab = 2a + 2b$$

or $$b = 2 + \frac{2b}{a}$$

or $$b - \frac{2b}{a} = 2$$

or $$\left(\frac{a-2}{a}\right)b = 2$$

or $$b = \frac{2a}{a-2}$$

I know that $a, b > 0$

Then $2a > 0, b > 0$

$\therefore a - 2 > 0$

$\therefore a > 2$

We use constraints to decrease the no. of ~~eq~~ rectangles. In this case we used the fact that $a, b > 0$. There are ∞ such rectangles.

Here the rectangles are shown with their area and perimeter which are functions of a, b. So if I reduce the numbers of values of a, b I reduce perimeter and area. I choose 3 different Cases for different ordering of a, b:

Case 1: $a = b$

$$b = \frac{2b}{b-2}$$

or $b(b-2) = 2b$

or $b^2 - 2b = 2b$

or $b^2 = 4b$

or $b = 4$

Case 2: $a > b$

$b < 4 < a$

and Case 3: $a < b$

$b > 4 > a$

However using this ordering we do double counting. When a is 6 and b is 3 is the same as a is 3, b is 6. So we can simply say that the shorter side <4 and longer side > 4.

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The shorter side of the rectangle $\leqslant 4$ and the longer side $\geqslant 4$ so that shorter side $= \dfrac{2 \times \text{longer side}}{\text{longer side} - 2}$ As there are ∞ such rectangles Alison is right. The above supports her statement.