

Math Challenge October 2022

Let's start the math challenge again, come on!

Taking into account the following algebraic equalities

$$a + \frac{1}{b} = b + \frac{1}{c} = c + \frac{1}{a}$$

Find the value of $a \cdot b \cdot c$ ($abc = ?$)

With a few simple steps of clearing and operating fractions you get there ;-)



If we take equalities two by two, we get a 3x3 system (three equations with three unknowns). In each equation we do two simple operations. In the end, the three equations are multiplied together and the result is reached!

$$\begin{cases} a-b = \frac{1}{c} - \frac{1}{b} \Rightarrow a-b = \frac{b-c}{bc} \Rightarrow bc = \frac{b-c}{a-b} \\ c-a = \frac{1}{b} - \frac{1}{a} \Rightarrow c-a = \frac{a-b}{ab} \Rightarrow ab = \frac{a-b}{c-a} \Rightarrow (abc)^2 = 1 \Rightarrow abc = \pm 1 \\ b-c = \frac{1}{a} - \frac{1}{c} \Rightarrow b-c = \frac{c-a}{ac} \Rightarrow ac = \frac{c-a}{b-c} \end{cases}$$

Correct answers:

Nuria Beltran

Maya Treuvat (1st Bat CT)

Anonymous (talk to your MAT teacher)

