

PROBLEMAS DE EXPRESIONES ALGEBRAICAS Y OPERACIONES

Problema 114:

Si se verifica que:

$$2(a + b + 2ab) = (a + b)(a + 1)(b + 1)$$

Simplificar:

$$E = \frac{ab + a + 2}{b + 1} + \frac{ba + b + 2}{a + 1}$$

Solución Problema 114:

$$\begin{aligned} E &= \frac{ab + a + 2}{b + 1} + \frac{ba + b + 2}{a + 1} = \frac{a(b + 1) + 2}{b + 1} + \frac{b(a + 1) + 2}{a + 1} = \\ &= \frac{a(b + 1)}{(b + 1)} + \frac{2}{(b + 1)} + \frac{b(a + 1)}{(a + 1)} + \frac{2}{(a + 1)} = a + \frac{2}{(b + 1)} + b + \frac{2}{(a + 1)} = \\ &= a + b + \frac{2}{(b + 1)} + \frac{2}{(a + 1)} = (a + b) + \frac{2}{(b + 1)} + \frac{2}{(a + 1)} = \\ &= \frac{(a + b)(a + 1)(b + 1) + 2(a + 1) + 2(b + 1)}{(a + 1)(b + 1)} = \end{aligned}$$

Aplicando la condición indicada en el enunciado:

$$(a + b)(a + 1)(b + 1) = 2(a + b + 2ab)$$

Tenemos:

$$\begin{aligned} &= \frac{2(a + b + 2ab) + 2(a + 1) + 2(b + 1)}{(a + 1)(b + 1)} = \frac{2(a + b + 2ab + a + 1 + b + 1)}{ab + a + b + 1} = \\ &= \frac{2(2a + 2b + 2ab + 2)}{a + b + ab + 1} = \frac{2 \cdot 2(a + b + ab + 1)}{a + b + ab + 1} = 2 \cdot 2 = 4 \end{aligned}$$