

Let $r, s \geq 1$ be integers and $a_0, a_1, \dots, a_{r-1}, b_0, b_1, \dots, b_{s-1}$ be real non-negative numbers such that

$$\begin{aligned} & (a_0 + a_1x + a_2x^2 + \cdots + a_{r-1}x^{r-1} + x^r) \\ & \cdot (b_0 + b_1x + b_2x^2 + \cdots + b_{s-1}x^{s-1} + x^s) \\ & = 1 + x + x^2 + \cdots + x^{r+s-1} + x^{r+s}. \end{aligned}$$

Prove that each a_i and each b_j equals either 0 or 1.