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$$\frac{\sum_{i=1}^n a_i b_i}{\sum_{i=1}^n a_i} = \frac{\frac{a_2((q^2)^{n-1})}{q^2-1}}{\frac{a_2((q^2)^{n-1})}{q^2-1}} = \frac{a_2}{a_1} = q$$