

Answer on Question #78833 – Math – Algebra

Question

Find the product of the first 99 terms of the sequence $1/2 \ 2/3 \ 3/4 \ 4/5$

Solution

The n^{th} element of sequence can be written as

$$a_n = \frac{n}{n+1}.$$

Then

$$a_n a_{n+1} = \frac{n}{n+1} \cdot \frac{n+1}{n+2} = \frac{n}{n+2}.$$

Thus, we can cancel out the denominator of a_n and the numerator of a_{n+1} . When we multiply N terms of the sequence the only things that does not vanish are the numerator of the first term, i.e. 1, and the denominator of the last term, i.e. $N+1$. In our case $N=99$.

Thus, the product of the first 99 terms of the sequence is $\frac{1}{100}$.

$$\text{Answer: } \frac{1}{2} \cdot \frac{2}{3} \cdot \frac{3}{4} \cdot \dots \cdot \frac{98}{99} \cdot \frac{99}{100} = \frac{1}{100}.$$