(A1, 2015) Prove that every nonzero coefficient of the Taylor series of 

\[(1 - x + x^2)e^x\]

about \(x = 0\) is a rational number whose numerator (in lowest terms) is either 1 or a prime number.

(A3, 2015) Let \(a_0 = 5/2\) and \(a_k = a_k^2 - 1 - 2\) for \(k \geq 1\). Compute

\[\prod_{k=0}^{\infty} \left(1 - \frac{1}{a_k}\right)\]

in closed form.

(B4, 1995) Evaluate

\[\sqrt{\frac{2207}{2207 - \frac{1}{2207 - \frac{1}{2207 - \cdots}}}}\]

Express your answer in the form \(\frac{a + b\sqrt{c}}{d}\), where \(a, b, c, d\) are integers.