

A connection between a continued fraction and π

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Abstract

Here I present an interesting equality between a continued fraction where the arctan function is involved and π .

Keywords: arctan function, pi, continued fraction

The equality

Let x denotes an integer such that $x > 1$. We define the function f such that:

$$f(x) = \frac{1}{\pi} \arctan(x)$$

We have:

$$f(x) = \frac{1}{a + \frac{1}{b + \frac{1}{c + \frac{1}{d + \dots}}}}$$

(a, b, c, d are integers ≥ 1) We have:

$$\lim_{x \rightarrow \infty} \frac{x}{b} = \frac{4}{\pi}$$