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Definition

A *real rational function* (or *rational function*) is a function $f : \mathbf{R} \rightarrow \mathbf{R}$ for which there exists polynomials $a, b \in \mathbf{R}^d$ with corresponding polynomial functions $p : \mathbf{R} \rightarrow \mathbf{R}$ and $q : \mathbf{R} \rightarrow \mathbf{R}$ so that $f(x) = p(x)/q(x)$ for all $x \in \mathbf{R}$.

In this case we call a the *numerator polynomial* (and p the *numerator function*) and b the *denominator polynomial* (and q the *denominator function*). Of course, the language *rational* is in reference to the fact that if p and q are integer-valued functions, then the function f is a rational-valued function (see Rational Numbers).

¹Future editions will include.

