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MATH 1201 (Polynomials) College Algebra Learning Journal Unit 3

College Algebra (University of the People)

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UNIVERSITY OF THE PEOPLE, USA.

COURSE NAME: COLLEGE ALGEBRA

COURSE CODE: MATH 1201

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Polynomials are mathematical expressions that include constants, exponents, and variables. They are used for arithmetic operations like addition, subtraction, multiplication, and non-negative integer exponents. As polynomials have no negative exponents, the domain of any polynomial is all real numbers.

On the other hand, any function that can be expressed as a rational fraction, that is, an algebraic fraction in which both the numerator and denominator are polynomials, is referred to as a rational function. The coefficients of the polynomials do not have to be from the same field; they can come from anywhere. As rational functions are useful examples and can be used in a variety of situations, polynomials are all rational functions.

Rational function is the name given to functions which can be represented as the quotient of polynomials, just as a rational number is a number which can be expressed as a quotient of whole numbers. Rational functions supply important examples and occur naturally in many contexts. The typical rational function has the form $p(x)/q(x)$ where p and q are polynomials. $P(x)$ is called the numerator and $q(x)$ is called the denominator.

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An example of the rational function: $g(x) = x^2 - 6 / x^2 - 8x + 66$

The numerator is x2 – 6 and the denominator is x2 – 8x + 66. A polynomial is a rational functions with denominator 1. The domain of the rational function. P (x) / q (x) consists of all points x where q(x) is non-zero. This domain really depends on the way in which p(x) and q(x) are chosen. Functions which are quotients of functions other than polynomials are not called rational functions. An asymptote for a function f(x) is a straight line which is approached but never reached by f(x).

Vertical asymptotes are vertical lines near which the function f(x) becomes infinite. If the denominator of a rational function has more factors of (x– a) than the numerator, then the rational function will have a vertical asymptote at x = a.

Horizontal Asymptote is a line y = c such that the values of f(x) get increasingly close to the number c as x gets large in either the positive or negative direction. Rational functions have horizontal asymptotes when the degree of the numerator is the same as the degree of the denominator. Oblique Asymptotes are of the form y = ax + b with a non-zero. Rational functions have oblique asymptotes if the degree of the numerator is one more than the degree of the denominator. The function g(x) above has an oblique asymptote, namely the line y = x.

The Monomial, Degree, Asymptote, Domain, Quotient, Root, Coefficient, Leading term, zero, and Factor are the concepts in mind.

Rational functions: y=1 / x and Polynomial functions: $y= x^2$ are the simplest functions I can imagine.

Polynomial function: the relation V=IR in electronics, for non-ohmic conductors, is a polynomial relating the resistance from a resistor to the current through it and the potential drop across it. Rational functions: In general, in distance-speed time applications.

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Polynomials are used to describe curves of various types, and people use them in the real world situations to graph curves. For example, roller coaster designers may use polynomials to describe the curves in their rides. The forest engineers may use the polynomials to determine the number of trees that needs to be re-planted.

To get the graph of the polynomial and rational functions; find the intercepts if applicable, finding the vertical asymptotes by setting the denominator equal to zero and solve it. Find the horizontal asymptotes by setting the denominator equal to zero and solve it. Sketching the graph or simple use Desmos online graphing tool which makes it easier.

Reference

Abramson, J. (2017). *Algebra and trigonometry*. OpenStax, TX: Rice University. Retrieved from https://openstax.org/details/books/algebra-and-trigonometry

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