MAT102 - College Algebra - Polynomial and Rational Functions

3.2 Introduction to Polynomial Functions [1]

Miraj Samarakkody

Tougaloo College

Updated - June 3, 2025

Determine the End Behavior of a Polynomial Function

Definition of a Polynomial Function

Let n be a natural number and $a_n, a_{n-1}, \ldots, a_1, a_0$ be real numbers, where $a_n \neq 0$. Then a function defined by

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$$

is called a **Polynomial function of degree** n.

Determine the End Behavior of a Polynomial Function

Definition of a Polynomial Function

Let n be a natural number and $a_n, a_{n-1}, \ldots, a_1, a_0$ be real numbers, where $a_n \neq 0$. Then a function defined by

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$$

is called a **Polynomial function of degree** n.

Examples for non-polynomial functions.

Several Special Cases of Polynomial Functions

Let $a \neq 0$.

$f(x) = c$	constant function	degree 0
$g(x) = ax + b$	linear function	degree 1
$h(x) = ax^2 + bx + c$	quadratic function	degree 2
$j(x) = ax^3 + bx^2 + cx + d$	cubic function	degree 3
$k(x) = ax^4 + bx^3 + cx^2 + dx + e$	quartic function	degree 4

Smoothness and Continuity

References


Julie Miller and Donna Gerken.
College Algebra.
McGraw-Hill Education, New York, 2nd edition, 2016.