FAR BEYOND

MAT122

Polynomial Function

Stony Brook University

Polynomials

leading coefficient

degree

degree:= highest power in polynomial

$a_1 x^1$

Format: $p(x) = \underbrace{a_n x^n}_{\text{leading term}} + a_{n-1}x^{n-1} + a_{n-2}x^{n-2} + \ldots + a_2 x^2 + a_1 x + a_0$

n is a non-negative integer

$a_0 x^0 = a_0 \cdot 1 = a_0$

$a_n, a_{n-1}, \ldots, a_2, a_1, a_0$ are real numbers

Examples of Polynomials:

$p(x) = -3x^5 + \sqrt{2}x^2 + 5$ degree = 5

no x^4 or x^3 terms

$p(x) = -3x^4(x-2)(x+3)$ polynomial is in *factored* form

degree = 6! How? 1st FOIL

shortcut: $-3x^4(x^1 - 2)(x^1 + 3)$

$x^4 \cdot x^1 \cdot x^1 = x^6$

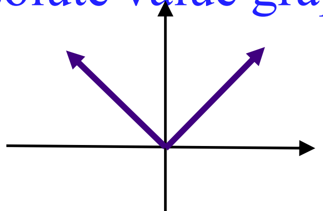
$= -3x^4(x^2 + x - 6)$ 2nd distribute

$= -3x^6 - 3x^5 + 18x^4$

domain = $\mathbb{R}$

Polynomials are smooth and continuous

not jagged like absolute value graph



$q(x) = 6 - x + x^3$ degree = 3

highest power –
not necessarily power of FIRST term