7-1 Polynomial Functions

Objective: Evaluate polynomial functions.
ID general shapes and graphs of polynomial functions.

P.346

Polynomial	Expression	Degree	Leading Coefficient
Constant	9	0	9
Linear	x - 2	1	1
Quadratic	$3x^2 + 4x - 5$	2	3
Cubic	$4x^3 - 6$	3	4
General	$a_0x^n + a_1x^{n-1} + \ldots + a_{n-2}x^2 + a_{n-1}x + a_n$	n	a_0

* Polynomial in one variable

Greatest exponent of its variable

Coefficient of term w/ highest degree

I. Find degree, leading coefficient, & if polynomial in one variable.

Ex1) $7z^3 - 4z^2 + z$

degree: 3
L.C.: 7
yes - polynomial in one variable

Ex2) $6a^3 - 4a^2 + ab^2$ Not a polynomial in one variable since we have "a" and "b"

Ex3) $3c^2 + 4c - \frac{2}{c}$ Not a polynomial since "c" is in the denominator.

Ex4) $9y - 3y^2 + y^4$ $= y^4 - 3y^2 + 9y$

D: 4
LC: 1
yes, a polynomial in one variable.

II. Evaluate a Polynomial

y =

Ex5) $f(r) = 2r^2 - 3r + 1$, Find f(4) and f(6)

$f(4) = 2(4)^2 - 3(4) + 1$
$f(4) = 32 - 12 + 1$
$f(4) = 21$

$f(6) = 2(6)^2 - 3(6) + 1$
$f(6) = 72 - 18 + 1$
$f(6) = 54 + 1$
$f(6) = 55$

Ex6) $p(x) = 2x^4 - x^3 + 3x$. Find $p(y^3)$

$p(y^3) = 2(y^3)^4 - (y^3)^3 + 3(y^3)$

$p(y^3) = 2y^{12} - y^9 + 3y^3$

$(2x-1)(2x-1) = 4x^2 - 4x + 1$

Ex7) $b(m) = 2m^2 + m + 1$ Find $b(2x-1) - 3b(x)$

$b(2x-1) - 3b(x)$

$2(2x-1)^2 + (2x-1) + 1 - 3(2x^2 + x + 1)$

$2(4x^2 - 4x + 1) + 2x - 6x^2 - 3x - 3$

$8x^2 - 8x + 2 + 2x - 6x^2 - 3x - 3$

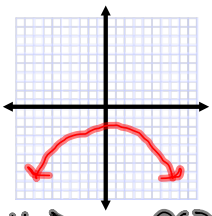
$= 2x^2 - 9x - 1$

III. Graphs of Polynomial Functions

** Pg. 348 Chart - Discuss looks of Graph
** Pg. 349 Chart - Discuss end behavior

Ex8) For each Describe: 1. End Behavior 2. Odd/even degree #. 3. # of real zeros

A)

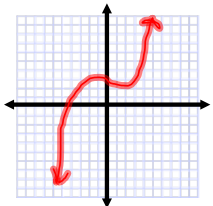


1. $x \to \infty, f(x) \to -\infty$
$x \to -\infty, f(x) \to -\infty$

2. Even-ends go in same direction.

3. None (Where graph crosses x-axis.)

B)

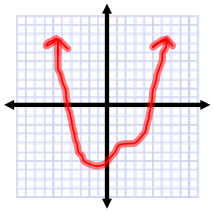


1. $x \to \infty, f(x) \to \infty$
$x \to -\infty, f(x) \to -\infty$

2. Odd-ends of graph go in opposite directions

3. 1

C) 3



1. $x \to \infty, f(x) \to \infty$
$x \to -\infty, f(x) \to \infty$

2. Even degree - ends going in same direction.

3. 2