



## Section 6-4: Polynomial Functions


Any polynomial that contains only one variable is a **polynomial in one variable**.

Example:  $a^4 - 7a^2 + 3$

Non-Example:  $ab^4 - 7a^2 + 3$

The **leading coefficient** is the coefficient of the term with the highest degree.

$$5x^4 - 2x^2 + 1$$

 leading coefficient

Examples:

State the degree and leading coefficient of each polynomial in one variable. If it is not a polynomial in one variable, explain why.

1)  $7z^3 - 4z^2 + z$

Degree: 3

LC: 7

2)  $6m^3 - 4m^2 + mn^2$

Contains both  $m$  and  $n$ , not a polynomial in one variable.

Degree: 3

A polynomial function is a continuous function written in equation form.

Example:  $f(x) = 6x^3 - 5x^2 + 2x - 15$

Examples:

Given the polynomial function  $f(r) = 3r^2 - 3r + 1$ , find the following.

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

$f(4) = 48 - 12 + 1$

$f(4) = 37$

4)  $f(5) = 3(5)^2 - 3(5) + 1$

$f(5) = 75 - 15 + 1$

$f(5) = 61$

5)  $f(-1) = 3(-1)^2 - 3(-1) + 1$

$f(-1) = 3 + 3 + 1$

$f(-1) = 7$

Examples:

$$b(n) = 2n^2 + n - 1$$

Find

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

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

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

$$b(2x-1) = 8x^2 - 8x + 2 + 2x - 1 - 1$$

$$b(2x-1) = 8x^2 - 6x$$

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

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

$$8x^2 - 6x - 3(2x^2 + x - 1)$$

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

$$2x^2 - 9x + 3$$

Homework: pg 336-338 #12-26 even, 34-42 even, 46-48 all, 58

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