Algebra 1
Mrs. Moore

Name: Key

6.3 Notes

A **monomial** is a number, a variable, or a product of numbers and variables with whole-number exponents (no negative exponents).

Monomials	Not Monomials
$5 \quad x \quad -7xy \quad 0.5x^4$	$-0.3x^{-2} \quad 4x - y \quad \frac{2}{x^3}$

variable in denominator

neg exponent

2 terms

The **degree of a monomial** is the sum of the exponents of the variables. A constant has degree 0.

$3x^2$ degree: 2

$3 \times x$

$3x^2y^3$ degree: 5

$3xx\,yyy$

Example 1: Find the degree of each monomial.

a.) $4p^4q^3$

7

b.) $7xy$

2

c.) 3

0

Example 2: Identify the coefficient and degree of each monomial.

a.) $1.5k^2m$

Coeff: 1.5
degree: 3

b.) $4x$

Coeff: 4
degree: 1

c.) $2c^3$

Coeff: 2
degree: 3

A **polynomial** is a monomial or a sum or difference of monomials.

Monomial – has 1 term $(3, \quad 3x, \quad 3xy, \quad 3x^2y)$

Binomial – has 2 terms $(2x+1, \quad 2x+3y, \quad 2x^2+3y^3)$

Trinomial- has 3 terms $(x^2+3x-1, \quad 4x^3-2xy+6, \quad 5x^5-3x^3-2)$

*Terms are separated by addition and subtraction

The **degree of a polynomial** is the degree of the term with the greatest degree.

Example 3: Find the degree of each polynomial.

a.) $11x^7 + 3x^3$

7 3

7

b.) $\frac{1}{3}w^2z + \frac{1}{2}z^4 - 5$

3 4 0

4

c.) $5x - 6$

1 0

1

d.) $x^3y^2 + x^2y^3 - x^4 + 2$

5 5 4 0

5

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The **standard form of a polynomial** that contains one variable is written with the terms in order from greatest degree to least degree.

When written in standard form, the coefficient of the first term is called the **leading coefficient**.

Example 4: Write the polynomial in standard form. Then give the leading coefficient and degree.

a.) $6x - 7x^5 + 4x^2 + 9$

$-7x^5 + 4x^2 + 6x + 9$

LC: -7

Degree: 5

b.) $y^2 + y^6 - 3y$

$y^6 + y^2 - 3y$

LC: 1

Degree: 6

c.) $16 - 4x^2 + x^5 + 9x^3$

$x^5 + 9x^3 - 4x^2 + 16$

LC: 1

Degree: 5

Some polynomials have special names based on their degree and the number of terms they have.

Degree	Name
0	Constant
1	Linear
2	Quadratic
3	Cubic
4	Quartic
5	Quintic
6 or more	6th, 7th, degree and so on

Terms	Name
1	Monomial
2	Binomial
3	Trinomial
4 or more	Polynomial

Example 5: Classify each polynomial according to its degree and number of terms.

a.) $5n^2 + 4n$ D: 2

quadratic binomial

b.) $5y^3 + 2y - 9$ D: 3

Cubic trinomial

c.) $3 - 2x$ D: 1

linear binomial

d.) $x^3 + x^2 - x + 2$ D: 3

Cubic Polynomial

e.) 6 D: 0

Constant monomial

f.) $-3y^8 + 18y^5 + 14y$ D: 8

8th degree trinomial

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Example 6: Complete the table by evaluating each polynomial for the given value of x.

Polynomial	$x = -2$	$x = 0$	$x = 5$
$5x - 6$	$5(-2) - 6 = -16$	$5(0) - 6 = -6$	19
$x^5 + x^3 + 4x$	-48	0	3270
$-10x^2$	-40	0	-250

$(-2)^5 + (-2)^3 + 4(-2)$

$-32 - 8 - 8$

-48

$5(5) - 6$

$25 - 6 = 19$

$(5)^5 + (5)^3 + 4(6)$

$-10(-2)^2$

$-10(4)$

-40

$-10(0)^2$

$-10(0)$

0

$-10(5)^2$

$-10(25)$

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Word Problem: A firework is launched from a platform 6 feet above the ground at a speed of 200 feet per second. The firework has a 5-second fuse. The height of the firework in feet is given by the polynomial $-16t^2 + 200t + 6$, where t is the time in seconds. How high will the firework be when it explodes?

$t = 5$

$-16t^2 + 200t + 6$

$-16(5)^2 + 200(5) + 6$

606 ft

Word Problem: A piece of 8.5-by-11-inch cardboard has identical squares cut from its corners. It is then folded into a box with no lid. The volume of the box in cubic inches is $4c^3 - 39c^2 + 93.5c$, where c is the side length of the missing squares in inches.

a. What is the volume of the box if $c = 1$ in.?

$4(1)^3 - 39(1)^2 + 93.5(1)$

$4 - 39 + 93.5$

58.5 in^3

b. What is the volume of the box if $c = 1.5$ in.?

$4(1.5)^3 - 39(1.5)^2 + 93.5(1.5)$

66 in^3

c. What is the volume of the box if $c = 4.25$ in.?

$4(4.25)^3 - 39(4.25)^2 + 93.5(4.25)$

0 in^3