Unit 7 Day 1 Notes: An Introduction to Polynomials

KEY

Monomial: is a number, variable, or the product of a number and one or more variables with whole number exponents (a monomial will never have addition, subtraction, division, or a negative exponent) * multiplication is OK

by a variable

Examples: $3x$, 15, $\frac{1}{2}ab^2$, $-5x^4$

Non - Examples: $x+3$, $\frac{5}{x}$, 3^x, x^{-4}

Polynomial: is a monomial or sum/difference of monomials, each called a *term* of the polynomial

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Examples: $x+3$

$2x^2+5x-7$

$7x^{10}$

Naming Polynomials

the highest exponent

By the # of terms

5	1	monomial
$4x^2+3$	2	binomial
x^3-8x+2	3	trinomial
	4+	polynomial

$5x^6+5x^5-7x^4+x^3+9x^2-3x+4$

By the degree

	0	constant — 10
	1	linear — $2x^1-6$
	2	quadratic — $3x^2+5x+2$
	3	cubic — $6x^3-1$
4th degree	4	(quartic) $8x^4$
5th degree	5	(quintic) $10x^5+4x^2-5x+3$

⋮

Fill out the following table :

highest exp to lowest exp

Polynomial	Standard Form	Leading Coefficient	Name by Degree	Name by # of Terms
1. $x-3x^3+2x^2+7$	$-3x^3+2x^2+x+7$	-3	cubic	polynomial
2. $4w-6w^2$	$-6w^2+4w$	-6	quadratic	binomial
3. $5+y$	$y+5$	1	linear	binomial
4. $3y^5-7y+1$	$3y^5-7y+1$	3	5th degree (quintic)	trinomial
5. 7	7	7	constant	monomial
6. ** $5x^2y^3$	$5x^2y^3$	5	2+3 = 5th degree	monomial

when there are 2 different variables in the same term, add the exponents to find the degree

Multiply:

1. $x \cdot x = x^2$ 2. $x^2 \cdot x^3 = x^5$ 3. $m \cdot m^4 = m^5$ Without writing it out: $m^{10} \cdot m^6 = m^{16}$

★REVIEW

Exponent Rule: $x^m \cdot x^n = x^{m+n}$

Like Terms: A "term" is a monomial. Like terms must have the same variables with the same corresponding degree. *Circle the like terms from each group of terms.*

a. $3x, 4y, 3y$

b. $3x^2, 4y, 3y^2$ ★ no like terms

c. $3x, \frac{1}{2}yx, 3xy$

d. $3x^2, 4y^2, 3y^2, 4x$

e. $x, 10x, -3x$

f. $2xy^2, 4y^2, 3x^2y, -2y^2x$

★ We can only add/subtract LIKE TERMS!

Simplify: *Combine Like Terms. Write your answer in decreasing order (standard form).*

1.) $(3s^2 + 7s - 6) + (s^3 + s^2 - s - 1)$

$s^3 + 4s^2 + 6s - 7$

2.) $(3x^2 - 2x + 10) - (2x^2 + 4x - 6)$

$3x^2 - 2x + 10 - 2x^2 - 4x + 6$

$x^2 - 6x + 16$

You try these!

4.) $(1 - 4x - x^4) - (-x - 3x^4)$

$1 - 4x - x^4 + x + 3x^4$

$2x^4 - 3x + 1$

4.) $(6x^5 + 2x^2 - 3x^3) + (x^4 + 3x^5 + 3x^2 + 3x^3 + 9)$

$9x^5 + x^4 + 5x^2 + 9$

6.) $(7x^5 - 2x^2 - 3x^3) - (2x^4 - x^5 - 3x^2 - 4x^3 + 5)$

$7x^5 - 2x^2 - 3x^3 - 2x^4 + x^5 + 3x^2 + 4x^3 - 5$

$8x^5 - 2x^4 + x^3 + x^2 - 5$

Be the teacher: Your mom is an Algebra teacher, and you are helping her grade papers. Correct this student's work:
Classify the following polynomials. Name each polynomial and identify the degree and leading coefficient.

1) $7s - 3s^2 - 6$ $-3s^2 + 7s - 6$

~~Monomial~~ Trinomial
Degree: 2
Leading Coefficient: ~~7~~ -3

2) $5x^4 - 3x^6$ $-3x^6 + 5x^4$

~~Trinomial~~ Binomial
Degree: ~~3~~ 6th
Leading Coefficient: ~~6~~ -3