

Unit 6: Polynomials

Part 1: Naming

SWBAT name polynomials by degree and number of terms.

Assignments:

HW44

*We will also be completing Lesson 6.2 today

Polynomials

- ▶ “Many terms”
- ▶ Some rules about exponents on variables...
 - ▶ No negative exponents
 - ▶ Can't divide by a variable!
 - ▶ No fractional exponents
 - ▶ No square roots/radicals
 - ▶ Radicals/fractions as *coefficients* are fine

▶ Examples:

- ▶ $x^6 - 7x^4 + 8x^2 - 9$
- ▶ $-13a^3 + 8a^2 + 9a - 19$
- ▶ $-2x^4 - x^3 + 7x^2 - 8x$
- ▶ $\frac{1}{2}x^2 - x + 9$

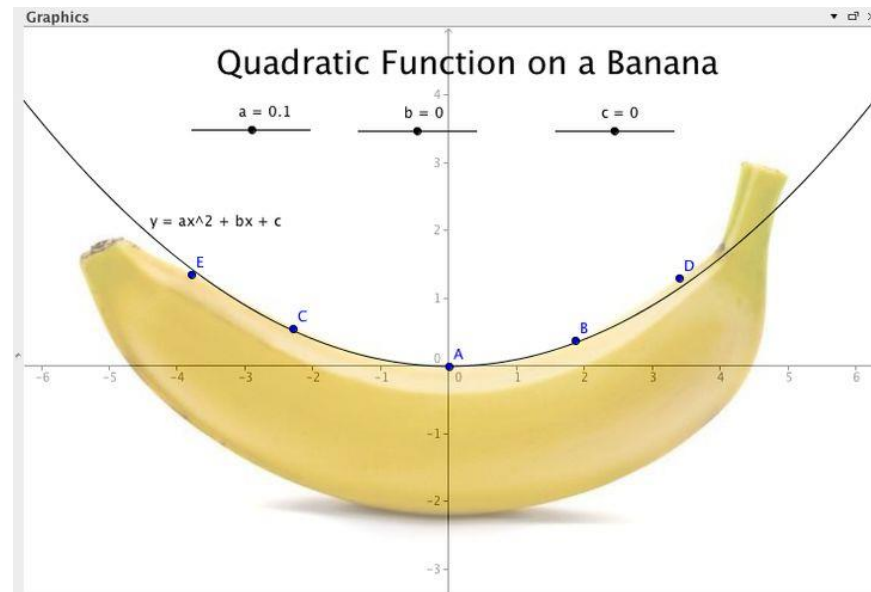
▶ Not Polynomials:

- ▶ $3x^2 + x - 7 - \frac{2}{x}$
- ▶ $4k^3 - 2\sqrt{k}$
- ▶ $x^3 + 8x^2 - x^{-1}$

Why Bother?

Polynomials are used to model all kinds of things, including:

- ▶ Trajectory of a baseball (or anything else that's falling)
- ▶ Roller coasters
- ▶ Stock market ups and downs
- ▶ Revenue for a fundraiser
- ▶ Weather patterns
- ▶ Animation



Naming Polynomials

Polynomial names are made of two parts:

▶ The biggest exponent (degree)

▶ 0: *constant* (no variable)

▶ 1: *linear*

▶ 2: *quadratic*

▶ 3: *cubic*

▶ 4: *fourth-degree*

▶ 5: *fifth-degree ...*

▶ How many terms it has

▶ 1 term: *monomial*

▶ 2 terms: *binomial*

▶ 3 terms: *trinomial*

▶ 4 terms: *polynomial with 4 terms*

▶ 5 terms: *polynomial with 5 terms*

...

Name the Polynomials

▶ Example: $-3x^6 - 9x + 2$

1. $-8k^5 - 4k^2$

2. $-9k^4 - 4k^3 - k^2 - 6k$

3. $3n - 8$

4. $3k$

5. $9k^5 + 4$

6. $-3k^6 + 9k^5 + 2k^3$

7. $-8x^4 + 2x^3 + 2x^2 - x$

8. $k^4 - 6k^3 - k^2 + 6$

9. $5n^6 - 2n^4 - 4$

10. 23

6.2 Operations

SWBAT add, subtract, and multiply polynomial expressions.

Assignments:

HW44

Adding Polynomials

▶ Step 1: Combine Like Terms

▶ $(8b^4 - 7 - 3b) + (7b + 8 - 8b^3)$

1. $(7n^3 - 6 - 7n^2) + (7 + 4n^3 + 3n^2)$

2. $(6 - 4m^4 + 6m) + (3m^4 - 4 - 8m)$

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

A few extra vocabulary terms:

- Standard form: terms are in order from the biggest exponent to the smallest
- Leading coefficient: coefficient of the term with the biggest exponent

Subtracting Polynomials

- ▶ Step 1: Distribute the negative (turn subtraction into addition)
- ▶ Step 2: Combine Like Terms
- ▶ $(v - v^4 + 4v^3) - (4v - v^4 - 8v^2)$

1. $(a - 2a^3 - 8a^4) - (a^3 - 5a - 6a^4)$
2. $(7n^3 - 5n^4 + 4) - (n^2 + 5n^4 + 5)$
3. $(7n^2 + 6n^3 + 6) - (8 + 2n^3 - 4n^2)$

Multiplying Polynomials: 2 Methods

▶ $(b + 1)(7b - 2)$

▶ Method 1: Regular Multiplication

▶ $(b + 1)(7b - 2)$

▶ Method 2: The Box Method

Multiplying Polynomials: 2 Methods

► *Regular Multiplication*

► $(b + 1)(7b - 2)$

$$\begin{array}{r} 7b - 2 \\ \times \quad b + 1 \\ \hline 7b - 2 \\ + 7b^2 - 2b \quad 0 \\ \hline \boxed{7b^2 + 5b - 2} \end{array}$$

► *Box Method*

► $(b + 1)(7b - 2)$

	$7b$	-2
b	$7b^2$	$-2b$
$+1$	$7b$	-2

$\boxed{7b^2 + 5b - 2}$

Multiplying Polynomials: 2 Methods

▶ $(b + 1)(7b - 2)$

1. $(2m + 7)(2m + 3)$

2. $(x + 3)(2x + 4)$

3. $(8n - 3)(7n + 6)$

Multiplying Polynomials

▶ $(4n^2 - 4n + 6)(n - 4)$

1. $(2k^2 + 8k + 8)(2k - 8)$

2. $(5k^2 + 3k - 5)(7k - 7)$

3. $(4x^2 - 7x + 7)(8x - 5)$

▶ $(4b^2 - 5b - 7)(8b - 5)$