

Unit 2 Polynomials and Rational Functions

ALGEBRA 2

Lesson 6

Different Forms





Unit 2 • Lesson 6

Learning Goal

Let's use the different forms of polynomials to learn about them.







Small Differences

Warm-up: Which One Doesn't Belong?

Which one doesn't belong?

A.
$$y = (x + 4)(x - 6)$$

B. $y = 2x^{2} - 8x - 24$
C. $y = x^{2} + 5x - 25$
D. $y = x^{3} + 3x^{2} - 10x - 24$











Earlier, we learned we can make a box from a piece of paper by cutting squares of side length *x* from each corner and then folding up the sides. Let's say we now have a piece of paper that is 8.5 inches by 14 inches. The volume *V*, in cubic inches, of the box is a function of the side length *x* where V(x) = (14 - 2x)(8.5 - 2x)(x).

- 1. Identify the degree and leading term of the polynomial. Explain or show your reasoning.
- 2. Without graphing, what can you say about the horizontal and vertical intercepts of the graph of *V*? Do these points make sense in this situation?







- 1. Use the distributive property to show that each pair of expressions is equivalent.
 - a. (x+2)(x+4) and $x^2 + 6x+8$
 - b. (x+6)(x+-5) and $x^2 + x + 30$
 - *c.* $(x^2 + 10x + 7)(2x 1)$ and $2x^3 + 19x^2 + 4x 7$
 - d. $(4x^3 8)(x^2 + 3)$ and $4x^5 + 12x^3 8x^2 24$
- 2. Write a pair of expressions that each have 2 or 3 terms, and trade them with your partner. Multiply the expressions they gave you.









Let f(x) = (x-2)(x+3)(x-7) and $g(x) = \frac{1}{2}(x-2)(x+3)(x-7)$.

- 1. Use the applet to explore both functions in the same window of $10 \le x \le 10$ and $-100 \le y \le 100$. Describe how the two graphs are the same and how they are different.
- 2. What degree do these polynomials have? Rewrite each expression in standard form to check.
- 3. Let h(x) = (3ix 6)(x + 3)(x 7). What do you think the graph of y = h(x) will look like compared to y = f(x)? Use the applet to check your prediction.









Spot the Differences















Lesson Synthesis

 $f(x) = 2x^3 - 18x^2 - 44x + 240$ f(x) = (x+4)(2x-6)(x-10)



- Where can you see the 240 in the factored form of the equation? In the graph?
- Which form do you think is better?
- Let's say g(x) is a polynomial with the same zeros and degree as f(x), but with a vertical intercept at (0, 120) instead of (0, 240). What could the equation for g(x) be?





Unit 2 • Lesson 6

I can identify features of polynomials and their graphs using their standard and factored forms.

Learning Targets

Algebra 2





Identifying Polynomial Features

Let *P* be a polynomial where P(x) = (x + 6)(x + 3)(x - 5).

- 1. Rewrite the polynomial in standard form.
- 2. Identify the degree and the constant term.







Cool-down



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