IM 9–12 MATH v.1

Unit 2

Polynomials and Rational Functions

ALGEBRA 2

Lesson 7

Using Factors and Zeros

Illustrative Mathematics®

Kendall Hunt

Learning Goal

Let's write some polynomials.

Algebra 2

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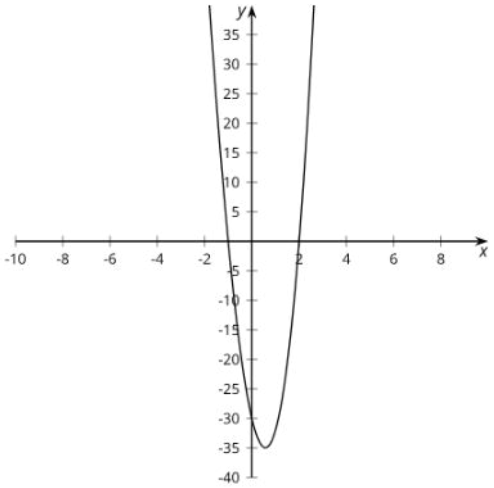
More Than Factors

Warm-up

M and K are both polynomial functions of x where $M(x) = (x + 3)(2x - 5)$ and $K(x) = 3(x + 3)(2x - 5)$.

1. How are the two functions alike? How are they different?
2. If a graphing window of $-5 \leq x \leq 5$ and $-20 \leq y \leq 20$ shows all intercepts of a graph of $y = M(x)$, what graphing window would show all intercepts of $y = K(x)$?

Choosing Windows



She says, "This graph looks like a parabola, so it must be a quadratic."

Mai graphs the function p given by $p(x) = (x + 1)(x - 2)(x + 15)$ and sees this graph.

1. Is Mai correct? Use graphing technology to check.
2. Explain how you could select a viewing window before graphing an expression like $p(x)$ that would show the main features of a graph.
3. Using your explanation, what viewing window would you choose for graphing $f(x) = (x + 1)(x - 1)(x - 2)(x - 28)$?

What's the Equation?

Write a possible equation for a polynomial whose graph has the following horizontal intercepts. Check your equation using graphing technology.

1. (4, 0)
2. (0, 0) and (4, 0)
3. (-2, 0), (0, 0) and (4, 0)
4. (-4, 0), (0, 0), and (2, 0)
5. (-5, 0), $\left(\frac{1}{2}, 0\right)$, and (3, 0)

Using Factors and Zeros

Lesson Synthesis

What have you learned so far about the relationship between the features of graphs and equations of polynomial functions?

I can write an expression for a function that has specific horizontal intercepts.

Learning Targets

Algebra 2

A Possible Polynomial Equation

Cool-down

Write an equation for a polynomial function whose graph intercepts the horizontal axis at -7, 8, and 15.