# Mathematics Class Slides
## Bronx Early College Academy

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GQ: How do we divide factors into polynomials?

Do Now: Given the function $f(x) = (x - 2)(x + 1)(x + 3)$

1. Using long division, calculate $14,772 \div 12$
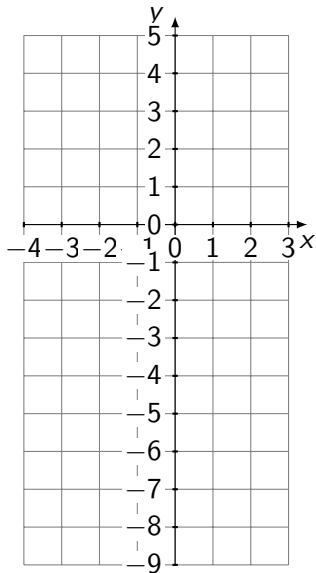
   Note: $(x^4 + 4x^3 + 7x^2 + 7x + 2) \div (x + 2)$

Lesson: Polynomial long division

## Polynomial long division, remainders

1. Find $f(1)$ if $f(x) = (x-1)(x^3 - 4x^2 + 18x - 31)$
2. Given that $(x-8)$ is a factor of $g(x)$. What is $g(8)$?
3. The graph of $h(x)$ has roots at $x = 4, 5, \& -1$. Find $h(5)$
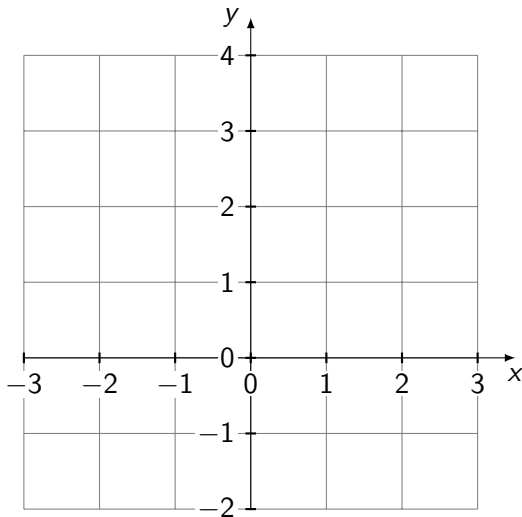4. Using long division, calculate $14,772 \div 12$

   Note: $(x^4 + 4x^3 + 7x^2 + 7x + 2) \div (x + 2)$

Graph $f(x) = (x - 2)(x + 1)(x + 3)$

## Graphing polynomials
Graph the function $f(x) = x^4 - 4x^2 + 3$

## Polynomials

Each polynomial function can be shown in two forms: standard and factored.

11.2

Standard form: From largest exponent to smallest
  Order or degree: value of the largest exponent
  Constant term: the ones value (8, in the example below)
Factored form: Product of binomials
  Factor: each monomial (e.g. "$(x + 1)$)

1. Evaluate $f(0)$ and $f(2)$ for each function below.

2. $f(x) = x^3 - 5x^2 + 2x + 8$

   $f(x) = (x + 1)(x - 2)(x - 4)$

# Vocabulary for polynomial functions

Standard form, factored form, order, degree

substitution, long division, remainder

$x$-intercepts, zeros, roots, solutions

$y$-intercept

end behavior, increasing/decreasing, turning points

symmetry, odd/even

## Interpreting a displacement vs time graph
CCSS: F.IF.B.6 Calculate & interpret the rate of change of a function

Consider the function $f(x) = -x^2 + 2x + 3$

1. Factor $f$ and state its zeros.

2. Restate $f$ in vertex form. Write down the vertex as an ordered pair.

3. Over what intervals is the function increasing, decreasing, and neither?

4. If $f(x)$ represents the height of a diver over the domain $0 \leq x \leq 3$, interpret $f(0)$, the vertex, and $f(3)$

5. What does the "slope" of the curve represent?