Name:_____Date:_____Period:_____

5-4 Dividing Polynomials (Part 1-Long Division)

Standards

A2.A.APR.A.1 (formerly A-APR.A.2) Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by $x - a$ is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).
A2.A.APR.C.4 (formerly A-APR.C.6) Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Key Concepts

The Divisor Algorithm-You can divide polynomial P(x) by polynomial D(x) to get the quotient Q(x) and a remainder R(x). If R(x) = 0, then D(x) and Q(x) are factors of P(x).

Examples

1. (I do) Divide $x^2 + 2x - 30$ by $x - 5$

2. (We do) Divide $(4x^2 + 23x - 16) \div (x + 5)$

3. (They do) Divide $(x^3 - 7x^2 - 36) \div (x - 2)$

4. (They do) Determine whether $x + 2$ is a factor of the polynomial $x^2 + 10x + 16$

You do Practice 5-4 Part 1: Complete your assignment on a separate sheet of paper. Show all work.

1. Divide using long division.
   a. $(2x^2 + 7x + 11) \div (x + 2)$
   b. $(x^3 + 5x^2 + 11x + 15) \div (x + 3)$
   c. $(9x^3 - 15x^2 + 4x) \div (x - 3)$

2. Determine whether $x + 1$ is a binomial factor of $x^3 + 4x^2 + x - 6$.