MTH 30 LECTURE NOTES (Ojakian)

Topic 12: Polynomial Division

OUTLINE

(References: 3.5, 3.6 (parts))

1. Polynomial Division
2. Use in factoring

---

1. Recall Long Division with numbers
   (a) Dividend (inside thing dividing into)
   (b) Divsor (what is dividing)
   (c) Quotient (how many times goes in)
   (d) Remainder (leftover)
   (e) Three ways to express result:
      i. State Quotient and Remainder
      ii. Express just Dividend (i.e. $= (Quotient)(Divisor)+Remainder$), the "division algorithm"
      iii. Express rational expression Dividend/Divisor
2. Division with Algebraic Expressions
   Do the above with algebra.
   (a) Problems from Section 3.5: 14, 15, 17, 21, 39, 41, 49
3. Remainder Theorem
   (a)

   Theorem 1. *If a polynmial $p(x)$ is divided by $(x-k)$, then the remainder is $p(k)$*
   (b) Exercises. Section 3.5: 6 - 13.
4. Rational Zeroes Theorem
   (a) Applies to a polynomial with integer coefficients.
   (b) Limits the CANDIDATE rational zeroes to those of the form $\frac{p}{q}$, where p divides the constant term and q divides the leading coefficient.
   (c) Exercises. Section 3.5: 56 - 60