MTH 28 LECTURE NOTES (Ojakian)

Topic 19: Quadratic Equations

OUTLINE
Reference: 9.1, 9.3

1. Quadratic Equations

   Question: What is a quadratic Equation?

   (a) By square root property (section 9.1)

   (b) Do by Factoring (sometimes works), Or

   (c) Use Quadratic formula (always works!) ...

   (d) Recall factoring example, and do harder square root property:
   $x^2 = 50$

2. Quadratic Formula

   Theorem 1. *(Quadratic Formula) For an equation of the form $Ax^2 + Bx + C = 0$, where $A, B,$ and C are constants ($A \neq 0$), the solutions are:*

   $$\frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

   Example: Solve by factoring and the quadratic equation: $x^2 + 2x - 15$

   Examples: Section 9.3 - 125, 129

   PROBLEM 1. *Solve by the quadratic equation (complex solutions allowed).*

   (a) $x^2 = 6x - 5$ *(also do by factoring)*

   (b) $3x^2 + 3x - 3 = 0$ *(can factor out 3 first ...)*

   (c) $3u^2 + 4 = 2u$

3. Application: Factoring - OPTIONAL ...

   Factor Theorem: If k is a zero of a polynomial, then $(x - k)$ is a factor.

   To Factor Any Quadratic Expression of form $Ax^2 + Bx + C$

   (a) Find the two roots: p and q (possibly $p = q$!)

   (b) Factorization: $A(x - p)(x - q)$