

MTH 28.5 LECTURE NOTES (Ojakian)

Topic 32: 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: $A(x - p)(x - q)$