

Solving Quadratic Equations Video Lecture

Sections 11.1 and 11.2

Course Learning Objective:

Solve certain types of quadratic equations.

Weekly Learning Objectives:

- 1) Use the square root property to solve quadratic equations.**
- 2) Solve quadratic equations by completing the square.**
- 3) Solve quadratic equations by using the quadratic formula.**

Solving Quadratic Equations

Solving by Factoring:

$$2x^2 + x = 3$$

$$3x^2 + 10x - 8 = 0$$

The Square Root Property: If b is a real number and if $x^2 = b$,
then $x = \pm\sqrt{b}$

$$x^2 = 7$$

$$x^2 = -4$$

$$(x+4)^2 = 5$$

$$(3x+1)^2 = -6$$

Completing the Square:

- 1) Put the variable terms on one side, the constant on the other side
- 2) If the coefficient of the squared term is not 1, divide both sides of the equation by the coefficient of the squared term
- 3) Find one half the coefficient of the x term and square it; add this result to both sides of the equation to complete the square
- 4) Write the variable expression as a perfect square and apply the the square root property

$$x^2 - 2x = 1$$

$$p^2 - \frac{8}{3}p = -1$$

$$2x^2 - 5x + 4 = 0$$

$$3x^2 - 5x - 2 = 0$$

The Quadratic Formula:

The solution to $ax^2 + bx + c = 0$ is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x^2 - 4 = 2x$$

$$9x^2 - 6x = -7$$

$$9x^2 - 12x + 4 = 0$$

Summary of how to solve quadratic equations:

- 1) If the linear (x) term is missing, isolate the quadratic term and use the square root property.
- 2) If the linear term is not missing, get all terms on one side and set equal to zero. Factor if possible, then set each factor to zero.
- 3) If the quadratic expression set equal to zero is not factorable, either:
 - a) Complete the square and use the square root property
 - OR
 - b) Use the quadratic formula