

# **Solving Non-Linear Equations Video Lecture**

## **Section 11.3**

### **Course Learning Objective:**

- 1) Solve certain types of quadratic, polynomial, rational, and radical equations.**
- 2) Model applications based on these types of equations.**

### **Weekly Learning Objectives:**

- 1) Solve various equations that are in quadratic form including quadratic, polynomial, rational and radical equations.**
- 2) Solve applications that lead to quadratic equations including distance and work problems.**

## Solving Non-Linear Equations

You can use quadratic methods (factoring, completing the square or the quadratic formula) to solve rational equations, cubic equations, and equations of the form:

$$ax^{2n} + bx^n + c = 0 \quad \text{or} \quad x^{\text{even}} - y^{\text{even}} = 0$$

$$\frac{4}{3x} - \frac{1}{2(x+1)} = 1$$

$$y^4 - 8y^2 + 16 = 0$$

$$z^4 = 81$$

$$z^3 = -125$$

$$3(m+2)^2 - 8 = 2(m+2)$$

$$3x^{\frac{2}{3}} - x^{\frac{1}{3}} - 24 = 0$$

$$3x^{\frac{1}{2}} + 2x^{\frac{1}{4}} - 1 = 0$$

$$y^{-2} - 8y^{-1} + 7 = 0$$

**Together, Scratchy and Freckles eat a 50 pound bag of dog food in 30 days. Scratchy by himself eats a 50 pound bag in 2 weeks less time than Freckles does by himself. How many days to the nearest whole day would a 50 pound bag of dog food last Freckles?**

**Mark Keaton's workout consists of jogging for 3 miles and then riding his bike for 5 miles at a speed 4 miles per hour faster than he jogs. If his total workout time is 1 hour, find his jogging speed and his biking speed.**