# Homework 2

June 15, 2016

## Problem 1.

Given data points $\{(x_1 = 1, y_1 = -5), (x_2 = -1, y_2 = 1), (x_3 = 2, y_3 = 7)\}$ set up a linear system of equation to solve for the variables $a_0$, $a_1$, $a_2$ such that for all $1 \leq i \leq 3$ we have

$$y_i = a_2 \cdot (x_i)^2 + a_1 \cdot (x_i)^1 + a_0 \cdot (x_i)^0$$

## Problem 2.

Set up and solve via Gauss-Jordan elimination the system of linear equation which determines the inverse of the matrix of

$$\mathbf{A} = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \frac{1}{2} i \sqrt{3} - \frac{1}{2} & -\frac{1}{2} i \sqrt{3} - \frac{1}{2} \\ 1 & -\frac{1}{2} i \sqrt{3} - \frac{1}{2} & \frac{1}{2} i \sqrt{3} - \frac{1}{2} \end{pmatrix} \tag{1}$$

## Problem 3.

Set up the following chemical balance equation as a system of linear constraints in order to find the coefficients $\{x_i\}_{1 \leq i \leq 4}$ via Gauss-Jordan elimination

$$x_1 \, \mathrm{NaOH} + x_2 \, \mathrm{H_2SO_4} \to x_3 \, \mathrm{Na_2SO_4} + x_4 \, \mathrm{H_2O}$$

## Problem 4.

Exercise 5 page 60 from the Book

## Problem 5.

Exercise 7 page 60 from the Book