

# WebAssign

## CH 5.6 (Homework)

Yinglai Wang  
MA 265 Spring 2013, section 132, Spring 2013  
Instructor: Alexandre Eremenko

**Current Score :** 20 / 20 **Due :** Thursday, March 28 2013 11:40 PM EDT

**The due date for this assignment is past.** Your work can be viewed below, but no changes can be made.

**Important!** Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

[Request Extension](#) [View Key](#)

1. 6.66/6.66 points | [Previous Answers](#)

KolmanLinAlg9 5.6.003.

Determine the least squares solution to  $A\mathbf{x} = \mathbf{b}$ , where

$$A = \begin{bmatrix} 1 & 2 & 1 \\ 1 & 3 & 2 \\ 2 & 5 & 3 \\ 2 & 0 & 1 \\ 3 & 1 & 1 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} -4 \\ 2 \\ 0 \\ 4 \\ -2 \end{bmatrix}.$$

(Round your answers to four decimal places.)

$$\mathbf{x} = \begin{bmatrix} -2.3333 \\ -4.6667 \\ 9.1667 \end{bmatrix}$$



2. 6.66/6.66 points | [Previous Answers](#)

The following data shows the size of the U.S. debt per capita (in thousand dollars).

<b>Year</b>	<b>Debt per Capita (in thousand dollars (K\$))</b>
1	20.1
2	20.5
3	20.8
4	21.2
5	20.1
6	20.9
7	22.3
8	24.1
9	25.9
10	27.4

(a) Determine the **line of best fit** to the given data.

(Let  $y$  denote the debt per capita (in dollars) for the year  $x$ . Round your coefficients to four decimal places.)

$y =$



(b) Predict the debt per capita for the years **11**, **15**, and **19**.

(Round your answers to the nearest whole number in thousand dollars (K\$).)

<b>Year</b>	<b>Predicted value rounded to whole dollars</b>
<b>11</b>	<input type="text" value="26"/>
<b>15</b>	<input type="text" value="29"/>
<b>19</b>	<input type="text" value="32"/>

3. 6.68/6.68 points | [Previous Answers](#)

For the data in the table below (the same as the previous problem), find the **least square quadratic polynomial approximation**.

(Let  $y$  denote the debt per capita (in thousand dollars) for the year  $x$ . Round your coefficients to four decimal places.)

$y =$



Compare this model with the linear model (obtained from the previous problem) by computing the **root mean square error** in each case.

(Round your answers to four significant figures.)

The **root mean square error** is defined as:

$$\sqrt{\sum (y_i - \hat{y}_i)^2}$$

where the  $\hat{y}_i$ 's and  $y_i$ 's are the approximated values and the actual data points.

error in the linear model 3.7245

error in the quadratic model 1.6435

Year	Debt per Capita (in thousand dollars (K\$))
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4	21.2
5	20.1
6	20.9
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8	24.1
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