

# Contest Quiz 4

## Question Sheet

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In this quiz we will cover the concepts of testing hypothesis and multiple linear regression.

NOTE: Use the full data set unless stated otherwise. Please round your results to two decimal places. Do not round any interim results.

EXAMPLE: If your unrounded solution is 0.13897439, drop all decimal places except the first three. This leaves you with 0.138. If the third decimal place is 5 or above (as is the case here), round up. This gives 0.14.

### Question 1

Load the hprice1.txt data set into EViews or RExcel from the url:  
<http://thiloklein.de/R/hprice1>

We are interested in estimating the selling price of a house based on its area, the number of bedrooms, the lot size and its architecture:

$$price_i = \beta_0 + \beta_1 sqrf_i + \beta_3 bdrms_i + \beta_4 colonial_i + \beta_5 lotsize_i + u_i$$

- I) What is the estimated increase in the price of a house with a lot of size 6000 sq ft., compared with one with a lot of size of 4500 sq ft.  
(a) 3.09 (b) 3.11 (c) 9.34 (d) 12.46
- II) What is the predicted selling price of a 2052-square-foot, 2 bedroom colonial house with a lot size of 5500 sq ft.?  
(a) 242.23 (b) 264.23 (c) 266.35 (d) 277.95
- III) What percentage of the variation in price is explained by the model?  
(a) 35.46% (b) 59.88% (c) 66.20% (d) 67.58%
- IV) What is the value in part (III) referred to in the economic literature?  
(a) p-value (b) R-squared (c) t-statistic (d) sum squared residuals

### Question 2

Load the eaef.txt data set into EViews or RExcel from the url:  
<http://thiloklein.de/R/eaef>

We want to see whether is possible to explain the weight of students with their height by estimating the model:

$$weight_i = \beta_0 + \beta_1 height_i + u_i$$

- I) Calculate the 95% confidence interval for  $\beta_1$   
 (a) (5.02,6.10) (b) (5.11,6.01) (c) (5.40,5.72) (d) (4.92,6.20)
- II) Calculate the 99% confidence interval for  $\beta_0$   
 (a) (-264.06,-177.87) (b) (-251.49,-190.44) (c) (-264.19,-177.74) (d) (-268.86,-173.07)
- III) What is the expected weight of a student with height 70 inches?  
 (a)162.85 (b) 168.41 (c) 179.53 (d) 389.37
- IV) They say that for every extra inch of height you should on average weigh 5.1 pounds more. By testing this hypothesis at a 5% significance level what should we conclude?  
 (a) Reject the null  $H_0 : \beta_2 = 5.1$  against  $H_1 : \beta_2 \neq 5.1$  (b) Do not reject the null  $H_0 : \beta_2 = 5.1$  against  $H_1 : \beta_2 > 5.1$  (c) Do not reject the null  $H_0 : \beta_2 = 5.1$  against  $H_1 : \beta_2 \neq 5.1$  and reject it against  $H_1 : \beta_2 > 5.1$  (d) Reject the null  $H_0 : \beta_2 = 5.1$  against  $H_1 : \beta_2 \neq 5.1$  and against  $H_1 : \beta_2 > 5.1$

### Question 3

We want to test whether the average height of the students in the dataset is 67. Using the dataset eaef.txt (<http://thiloklein.de/R/eaef>), answer the following:

- I) Evaluate the t-test statistic associated with the above test  
 (a) 2.57 (b) 2.49 (c) 2.70 (d) 2.36
- II) Find the critical value for a two sided test and 5% significance level  
 (a)  $\pm 1.65$  (b)  $\pm 2.58$  (c)  $\pm 1.96$  (d)  $\pm 3.33$
- III) Calculate the p-value for the test statistic in (I)  
 (a) 0.00 (b) 0.06 (c) 0.25 (d) 0.01
- IV) What conclusion do we make about the average weight of the population?  
 (a) Reject the one-sided test at 1% significance level (b) Do not reject the two-sided test at 5% (c) Do not reject the one-sided at 5% (d) Reject the two-sided test at 1%

### Question 4

Use the dataset growth.txt from <http://thiloklein.de/R/growth>. Consider the model  $EMPGROW_i = \beta_1 + \beta_2 GDPGROW_i + u_i$ . We are concern with the goodness of fit of the regression line.

- I) Evaluate  $\sum_{i=1}^{25} (Y_i - \hat{Y}_i)^2$   
 (a) 10.13 (b) 10.28 (c) 33.10 (d) 33.55
- II) What is the number in (I) referred in the econometrics literature?  
 (a) Total sum of squares (b) Residual sum of squares (c) Explained sum of squares
- III) Evaluate  $\sum_{i=1}^{25} (Y_i - \bar{Y})^2$   
 (a) 25.35 (b) 20.25 (c) 24.70 (d) 28.46
- IV) What is the number in (III) referred in the econometrics literature?  
 (a) Total sum of squares (b) Residual sum of squares (c) Explained sum of squares
- V) Evaluate  $\sum_{i=1}^{25} (\hat{Y}_i - \bar{Y})^2$   
 (a) 24.70 (b) 14.58 (c) 20.25 (d) 10.13

- VI) What is the number in (V) referred in the econometrics literature?  
(a) Total sum of squares (b) Residual sum of squares (c) Explained sum of squares
- VII) Calculate the correlation coefficient for the actual and predicted values of the variable empgrow  
(a) 0.59 (b) 0.77 (c) 0.57 (d) 0.66
- VIII) The number in (VII) is corresponds to  
(a) the coefficient of determination (b) the square of the coefficient of determination (c) the square root of the coefficient of determination (d) none of these