STAT 614 CLASSWORK LINEAR REGRESSION and MULTIPLE REGRESSION

**Head Circumference** A pediatrician wants to determine the relationship that may exist between a child’s head circumference (in centimeters), height (in inches), and weight (in ounces). She randomly selects 14 three year old children from her practice and obtains the following data:

|  |  |  |
| --- | --- | --- |
| HEIGHT | WEIGHT | HEAD CIRCUMFERENCE |
| 30 | 339 | 47 |
| 26.25 | 267 | 42 |
| 25 | 289 | 43 |
| 27 | 332 | 44.5 |
| 27.5 | 272 | 44 |
| 24.5 | 214 | 40.5 |
| 27.75 | 311 | 44 |
| 25 | 259 | 41.5 |
| 28 | 298 | 46 |
| 27.25 | 288 | 44 |
| 26 | 277 | 44 |
| 27.25 | 292 | 44.5 |
| 27 | 302 | 42.5 |
| 28.25 | 336 | 44.5 |

1) Use and show R code to construct a coefficient matrix. Is there multicollinearity involving any of the explanatory variables? If so, what variables are of concern? (Head Circumference is the response variable)

2) Use and show R code to produce the full multi regression model where the response variable is Head Circumference and the two explanatory variables are Height and Weight.

3) Use and show R code to produce the summary table for your full model. Indicate the variable whose p value is not significant at the level of .05. And also indicate what proportion of the variability in Head Circumference is explained by your model.

4) Use and show R code that will produce a linear regression model with the explanatory variable of no significance removed.

1. Interpret the slope of this model
2. What proportion of the variability of the response variable is not explained by the linear regression model? (SHOW ALL OF YOUR WORK)
3. Find the correlation coefficient ***r*** for the linear model.
4. Does ***r*** suggest a linear relationship that is weak, moderate, strong, or very strong?
5. What is the value of the standard error for the explanatory variable? Explain what it means in two or sentences.