BIOS 591P, Spring 2022 HW for the Week of Feb 01, 2022

Complete the following by **3pm Tuesday February 8, 2022**.
- Read chapter 7 in the textbook as follows:
- For practice, try the following problems from the textbook (but do not turn these in):
    - Chapter 7, problems 1 and 11. Do all work by hand (i.e., do not use SAS, R, Excel or any other computer software or any statistical functions on your calculator). When performing F-tests, use on the tables in the Kleinbaum text –do not use F-tables from any other source.

    Try additional problems from the textbook, for practice –as many as you need in order to become comfortable with the material.
- Complete Q.1 to 5 below. Work all answers out carefully on paper first and then select the most appropriate answer choice. Do not use SAS/R/Excel or any statistical functions on your calculators; you may use simple mathematical functions (e.g., square, square root, addition/subtraction/division/multiplication) on hand-held calculators or smartphone calculator apps. When you have finalized all answers, enter your choices in Canvas in the 'HW 04 Week of Feb 01' quiz item.

Q. 1-8. A biologist wished to study the effects of the temperature of a certain medium on the growth of human amniotic cells in a tissue culture. She conducted an experiment in which five cell lines were cultured at each of four temperatures. The number of cells was measured 7 days after culturing.

Edited SAS computer output for the regression of # of cells (Y) on temperature (X), is shown below. You will need the output to answer questions 1-8 below. It is very important that you answer the questions <u>in order</u>, and that you make sure you keep enough decimal places in all values used in calculations in order to assure that your final answer is accurate to the requested decimal places.

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                  # OF CELLS (Y) REGRESSED ON TEMPERATURE (X)

                            Descriptive Statistics
Variables      Sum       Mean      Variance            Std Deviation
X             1400         70      526.31578947        22.941573387
Y             40.9      2.045      0.6945736842        0.8334108736


                            Analysis of Variance
                                Sum of         Mean
     Source         DF         Squares        Square     F Value        Prob>F
     Model           1        12.83072      {edited out} {edited out} {edited out}
     Error          18     {edited out} {edited out}
     C Total        19     {edited out}

         Root MSE        0.14263      R-square         {edited out}
         Dep Mean        2.04500      Adj R-sq         0.9707
         C.V.            6.97454

                            Parameter Estimates
                  Parameter      Standard      T for H0:
     Variable     Estimate          Error    Parameter=0      Prob > |T|
     INTERCEP     -0.462400      0.10481069        -4.412         0.0003
     X             0.035820      0.00142629    {edited out}    {edited out}
```
Remember: SSY and SSE were calculated in the previous homework…

1. What is the value of R^2 (accurate to 2 decimal places)?

   A. 0.94
   B. 0.95
   C. 0.97
   D. 0.05

2. What is the p-value for the overall F-test? **Use the F-tables in the Kleinbaum text to find the most precise answer possible given just this problem's ANOVA table and the Kleinbaum F-tables. No calculator functions or computer apps should be used here; only use the Kleinbaum tables –do not use tables from any other source…).**

   A. <0.05
   B. <0.01
   C. <0.005
   D. <0.001

3. **Using only the statistics that are shown in the parameter estimates table:** What is the value of the test statistic for the t-test for the significance of the slope (accurate to 2 decimal places)?

   A. 630.71
   B. 25.11
   C. -4.41
   D. -0.46

4. **Using only use statistics that are shown in the parameter estimates table:** What is the test statistic value for the t-test for the significance of the correlation coefficient (accurate to 2 decimal places)?

   A. 630.71
   B. 25.11
   C. -4.41
   D. -0.46

5. A 95% interval for the average number of cells when temperature=50 (accurate to 2 decimal places) is:

   A. (1.24, 1.42)
   B. (1.24, 1.42)
   C. (1.24, 1.42)
   D. (1.24, 1.42)

(No, the above is not a mistake 😊. Your hand calculations should yield the answer shown above. If it does not, check in with a TA during office hours to figure out why!)