60080079 Introduction to Statistical Methods
Semester 2 2023-2024
Homework Assignment 10

21 CST H3Art

Use the following table for **Problems 1-4**. Nutrition facts labels provide consumers with information about the nutritional value of food products that they buy. A study of these labels collected from 162 consumers who were sent information about a frozen chicken dinner. Each subject was asked to give an overall product nutrition score and also evaluate each of 10 nutrients on a 9-point scale, with higher values indicating that the product has a healthy value for the given nutrient. Composite scores for favorable nutrients (e.g., protein and fiber) and unfavorable nutrients (e.g., fat and sodium) were used in multiple regression to predict the overall product nutrition score. The following are the regression results:

Explanatory Variable	***B***	***se***	***t***	**Model *F***	R^2
				44.0**	0.36
Constant	3.96	0.12	32.8**		
Unfavorable Nutrients	0.86	0.12	6.9**		
Favorable Nutrients	0.66	0.10	6.9**		

** $p < 0.01$

1. The equation of the least-squares line is:

Overall = 3.96 + 0._ 6×Favorable + 0._ 6×Unfavorable.

1) 5
2) 6
3) 7
4) 8

Write your answer as a two-digit number.

Answer: 24

2. The null and alternative hypotheses associated with the entry level "Model *F*" are ___ β(s) is(are) zero and ___ β(s) is(are) not equal to zero, respectively. The p-value associated with the test statistic is ___ than .001, so we can ___ the null hypothesis.

1) One
2) All
3) At least one
4) less
5) greater
6) retain
7) reject

Write your answer as a four-digit number.

Answer: 2347

3. From the column labeled "*t*," both predictors are ___, indicating that both predictors ___ contribute to the model when the other predictor is already in the model.

1) significant
2) not significant
3) still
4) no longer

Write your answer as a two-digit number.

Answer: 13

4. Overall, the model can account for ___ of the variance in the response.

1) 36%
2) 44%
3) 60%

Write your answer as a single-digit number.

Answer: 1

Use the HSB data set to solve the **Problems 5-10**. We want to investigate the usefulness of predicting science score from reading, writing, math and civics scores. Use α =.01 for this problem.

5. The multiple regression model with four predictors ___ useful in predicting science score. The computed statistic is 181. _ _ _.

1) is
2) is not
3) 1
4) 5
5) 8
6) 9

Write your answer as a four-digit number.

Answer: 1365

6. When we run four separate simple linear regression analyses with reading, writing, math and civics scores as predictor, we can conclude that ___ are useful in predicting science score.

1) 0
2) 1

3) 2
4) 3
5) 4

Write your answer as a single-digit number.

Answer: 5

7. Based on the coefficients table associated with the four-predictor regression analysis, we can conclude the ___ predictors are useful in predicting science score even when the three other predictors are already in the model.

1) 0
2) 1
3) 2
4) 3
5) 4

Write your answer as a single-digit number.

Answer: 3

8. Combining 6 and 7, we can conclude that Reading is ___, Writing is ___, Math is ___, and Civics is ___.

1) useful by itself ONLY
2) useful even with three predictors already in the model ONLY
3) useful by itself AND with three other predictors in the model.

Write your answer as a four-digit number.

Answer: 3131

9. The proportion of variance in the science scores that the model with four predictors can account for 0._ 49.

1) 1
2) 3
3) 5
4) 7

Write your answer as a single-digit number.

Answer: 3

10. The *F*-statistic for the four-predictor regression model follows the ___ distribution.

1) $t(595)$
2) $t(599)$
3) $F(4, 595)$

4) $F(4, 599)$

Write your answer as a single-digit number.

Answer: 3