Name:

SM339 · Applied Statistics

Spring 2024 · Uhan

Quiz 5 – 2/29/2024

Instructions. You have 15 minutes to complete this quiz. You may use your plebe-issue TI-36X Pro calculator. You may refer to notes that you have handwritten, not to exceed one side of an 8.5" × 11" piece of paper. <u>No collaboration allowed.</u>

<u>Show all your work.</u> To receive full credit, your solutions must be completely correct, sufficiently justified, and easy to follow.

Problem	Weight	Score
1a	0.5	
1b	2	
2	0.5	
3	1	
Total		/ 40

For this quiz, consider the following setting.

You are working with data for 36 breakfast cereals. Your data consists of two variables: *Calories* per serving and grams of *Fiber* per serving. You are interested in predicting *Calories* based on *Fiber*. With this data, you fit a simple linear regression model.

Below is output from `summary()` for your model:

```
Call:
lm(formula = Calories ~ Fiber, data = Cereal)

Residuals:
    Min      1Q  Median      3Q     Max
-17.363  -7.363  -4.005   1.413  55.801

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 117.3635     3.7216  31.536  < 2e-16 ***
Fiber        -4.3881     0.7358  -5.964  9.6e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 15.72 on 34 degrees of freedom
Multiple R-squared:  0.5112,  Adjusted R-squared:  0.4969
F-statistic: 35.56 on 1 and 34 DF,  p-value: 9.603e-07
```

Below is output from `anova()` for your model:

A anova: 2 × 5

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
	<int>	<dbl>	<dbl>	<dbl>	<dbl>
Fiber	1	8790.003	8790.003	35.56416	9.602702e-07
Residuals	34	8403.407	247.159	NA	NA

Problem 1. You want to determine whether *Fiber* has a statistically significant association with *Calories*. Perform an appropriate hypothesis test with significance level 0.05. In particular,

    a. State the full name of the hypothesis test you chose.

    b. Perform all four steps of the hypothesis test. Circle any output on the reverse page that you used in your test.

Problem 2. How much variability in *Calories* is explained by the model?

Problem 3. Based only on the information given and your answers to Problems 1 and 2, does more fiber in a serving of cereal cause more calories in a serving of cereal? Briefly explain.