

0/21 Questions Answered

Problem Set 1

Q1**5 Points**

Ronald Aylmer Fisher was an English statistician, evolutionary biologist, and geneticist who worked on a data set that contained sepal length and width, and petal length and width from three species of iris flowers (setosa, versicolor and virginica). There were 40 flowers from each species in the data set.

Q1.1**1 Point**

How many cases are included in the data?

[Save Answer](#)**Q1.2****2 Points**

How many numerical variables are included in the data? Indicate what they are, and if they are continuous or discrete.

[Save Answer](#)

Q1.3**2 Points**

How many categorical variables are included in the data, and what are they? List the corresponding levels (categories).

[Save Answer](#)**Q2****1 Point**

A small company took a survey on all of its 70 employees to determine what proportion participates in volunteer activities. In a statistics class, four students made the following statements. Which of the students' response is true?

Student A: The company should not use this data because this is an observational study.

Student B: The company can use this result to prove that working for the company causes employees to participate in volunteer activities.

Student C: The company did not select a random sample of employees, so the survey will not provide the company with any useful information.

Student D: The company can determine the proportion because this survey was already a census of all employees.

[Save Answer](#)

Q3**4 Points**

In a survey, a random sample of 1,155 Americans was asked the question: "After an average work day, about how many hours do you spend doing other activities?" The average time spent relaxing was found to be 1.50 hours. Determine which of the following is an observation, a variable, a sample statistic (value calculated based on the observed sample), or a population parameter.

Q3.1**1 Point**

One American in the sample.

[Save Answer](#)**Q3.2****1 Point**

Number of hours spent relaxing after an average work day.

[Save Answer](#)**Q3.3****1 Point**

1.50.

[Save Answer](#)

Q3.4**1 Point**

Average number of hours all Americans spend relaxing after an average work day.

[Save Answer](#)

Q4**7 Points**

Chia Pets – those terra-cotta figurines that sprout fuzzy green hair – made the chia plant a household name. But chia has gained an entirely new reputation as a dietary supplement.

In one 2009 study, a team of researchers recruited 38 men and divided them randomly into two groups: treatment or control. They also recruited 38 women, and they randomly placed half of these participants into the treatment group and the other half into the control group. One group was given 25 grams of chia seeds twice a day, and the other was given a placebo. The subjects volunteered to be a part of the study.

After 12 weeks, the scientists found no significant difference between the groups in appetite or weight loss.

Q4.1**1 Point**

What type of study is this?

[Save Answer](#)**Q4.2****2 Points**

What are the experimental and control treatments in this study?

[Save Answer](#)

Q4.3**1 Point**

Has blocking been used in this study? If so, what is the blocking variable?

[Save Answer](#)**Q4.4****1 Point**

Has blinding been used in this study?

[Save Answer](#)**Q4.5****2 Points**

Comment on whether or not we can make a causal statement, and indicate whether or not we can generalize the conclusion to the population at large.

[Save Answer](#)

Q5**5 Points**

A study is designed to test the effect of light level on exam performance of students. The researcher believes that light levels might have different effects on males and females, so wants to make sure both are equally represented in each treatment. The treatments are fluorescent overhead lighting, yellow overhead lighting, no overhead lighting (only desk lamps).

Q5.1**1 Point**

What is the response variable?

[Save Answer](#)**Q5.2****2 Points**

What is the explanatory variable? What are its levels?

[Save Answer](#)

Q5.3**2 Points**

What is the blocking variable? What are its levels?

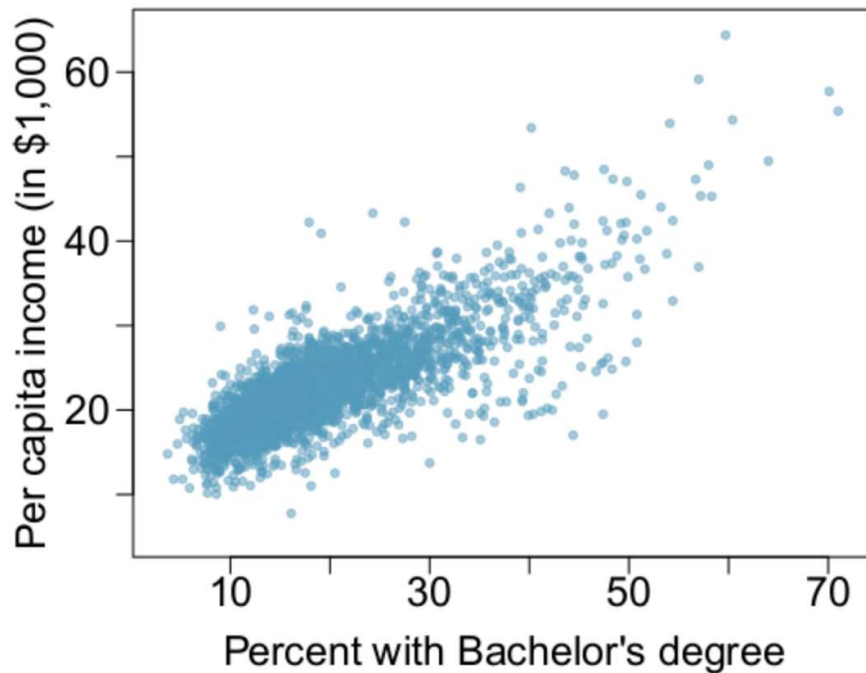
[Save Answer](#)**Q6****3 Points**

Briefly outline a design for a blind randomized control trial using your classmates as participants to determine preference for the taste of Coke or Pepsi.

[Save Answer](#)

Q7**4 Points**

The scatterplot below shows the relationship between per capita income (in thousands of dollars) and percent of population with a bachelor's degree in 3,143 counties in the US in 2010.

**Q7.1****1 Point**

What are the explanatory and response variables?

[Save Answer](#)

Q7.2**2 Points**

Describe the relationship between the two variables. Make sure to identify unusual observations, if any.

[Save Answer](#)**Q7.3****1 Point**

Can we conclude that having a bachelor's degree increases one's income?

[Save Answer](#)

Q8**1 Point**

An article titled Risks: Smokers Found More Prone to Dementia states the following:

Researchers analyzed data from 23,123 health plan members who participated in a voluntary exam and health behavior survey from 1978 to 1985, when they were 50-60 years old. 23 years later, about 25% of the group had dementia, including 1,136 with Alzheimer's disease and 416 with vascular dementia. After adjusting for other factors, the researchers concluded that pack-a-day smokers were 37% more likely than nonsmokers to develop dementia, and the risks went up with increased smoking; 44% for one to two packs a day; and twice the risk for more than two packs."

Based on this study, can we conclude that smoking causes dementia later in life? Explain your reasoning.

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