

Caveat: The appearance of a problem on this review sheet doesn't guarantee that a similar problem will appear on the exam. Similarly, the non-appearance of a kind of a problem doesn't imply that it won't appear on the exam. Last, the number of problems on this review and their difficulty is not to be taken as a statement about the exam. Enjoy!

1. A sociologist is interested in the breakdown of kinds of careers in these four prominent West Coast cities: Seattle, Portland, San Francisco, and Los Angeles. The researcher's broad career categories are High Tech, Financial, Service, Retail, and Artisinal Doughnut Crafter. The sociologist carefully surveys a random sample in each of the four cities to learn the respondents' careers. **What statistics procedure will the sociologist do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

2. (adapted from real data at fivethirtyeight.com) A columnist decided to compare powerlifters' (a weight-lifting category) capacity in three different independent leagues. The USAPL enforces strict drug testing, Raw Unity doesn't drug test, and the IPF randomly tests a small percentage of its competitors. The columnist collected the total amount of weight deadlifted by each competitor for a random sample of competitors from one event for each league, and calculated the mean weights. **What statistics procedure should the columnist do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

3. A rogue meteorologist attempts to predict the amount of rain (in inches) that will fall over a one day period by measuring the amount of rain that falls each day (in inches), the mean temperature (in Celsius), the median air pressure (in isobars), the number of apples sold that day at the local Market Basket, and the price that day of a barrel of crude oil (in \$). **What statistics procedure will the rogue meteorologist do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

4. A biologist who studies panda bears is married to the meteorologist in problem 3, and is also interested in rainfall. The biologist measures the amount of rain that falls each day (in mm), and also measures the average growth of their extensive bamboo garden per day (in mm). **What statistics procedure will the biologist do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

5. A soon-to-be-fired junior high school health teacher decides to take a group of randomly selected students to an R-rated horror movie. The teacher measures each of their heart rates in the morning (before telling them that they're going) and then again immediately after the movie ends. **What statistics procedure will the health teacher do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

6. A legal advocate wonders if it is the case that a federal judge's political affiliation is related to the kind of sentence the judge passes on those found guilty. The advocate decides a judge may be Democrat, Republican, Insane Clown Posse, or Other, and that a sentence may be either Lenient, Reasonable, Harsh, or Holy Crap. **What statistics procedure should the advocate do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

7. (adapted from real data from gallup.com) Over 14,000 adults living in the U. S. earning more than \$90,000/year were asked how much money they spent daily in the month of November. A policy wonk believes, based on a complicated theory, that the figure would be \$150/day. The mean for the sample was \$166/day. **What statistics procedure will the wonk do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

8. (more data from gallup.com) The Gallup people tele-polled a careful random sample of 1020 adults living in the U. S. and asked them if they approved or didn't approve of thirteen different government agencies, including the Postal Service, the CDC, the FBI, FEMA, and the IRS. An Iced Coffee Party political analyst assumed that all 13 agencies would be equally disapproved of by the American public. **What statistics procedure will the analyst do with the data to test that assumption? What are the H_0 and the H_a for the appropriate hypothesis test?**

9. (adapted from real data reported in the New Yorker) Two researchers at Stanford decided to test the effect of walking in the woods on creativity for a randomly-selected group of Psycho 10101010101... students. The students walked in the woods for an hour, then were asked (this is real) to contemplate a metaphor, such as "a budding cocoon," and generate a unique but equivalent metaphor such as "an egg hatching." Some students in the sample were able to generate such a metaphor and others weren't. The researchers assumed that 60% of the students would be able to generate a unique but equivalent metaphor. **What statistics procedure should the researchers do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**

10. (more real data adapted from the same article) The two researchers also decided to test the effect of walking in the woods on creativity by randomly splitting another random sample of students into two groups. The first group of students walked in the woods for an hour, while the second played with their phones or watched TV. Each group was asked to generate creative uses for things such as Q-tips, and the number of 'creative uses for a boring object' were counted for each student. The researchers want to test if there is a difference between the outcomes of the two samples: hikers or electronics-users. **What statistics procedure should the researchers do with the data? What are the H_0 and the H_a for the appropriate hypothesis test?**