Week 7 Monday

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Make sure you know your neighbors' names. Then discuss:

Which of the following, if any, are accurate statements about a p-value?

- (a) It is a probability that  $H_0$  is true.
- (b) It is a probability that the data was produced by random chance alone.
- (c) It is a probability of observing certain kinds of data assuming  $H_0$ .
- (d) If it is big, it proves  $H_0$ , and if it is small, it disproves  $H_0$ .
- (e) It is a measure of the size or importance of an effect.

p-values for means

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1. Suppose that researchers interested in lead exposure due to car exhaust tested blood lead concentration in a simple random sample of 25 traffic controllers. The sample data was roughly normal with an average lead concentration of 120 g/L and a standard deviation of 30 g/L. A previous study of individuals with no significant history of exposure to car exhaust found an average blood lead concentration of 35 g/L.

Calculate and interpret a p-value for the data under the hypothesis that average blood lead concentration of traffic controllers matches that of individuals with no significant history of exposure to car exhaust.

- 2. Which of the following describes paired data?
- (A) We would like to know if Intel's stock and Southwest Airlines' stock have similar rates of return. To find out, we take a random sample of 50 days, and record Intel's and Southwest's stock on those same days.
- (B) We randomly sample 50 items from Target stores and note the price for each. Then we visit Walmart and collect the price for each of those same 50 items.
- (C) A school board would like to determine whether there is a difference in average SAT scores for students at one high school versus another high school in the district. To check, they take a simple random sample of 100 students from each high school.

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(D) None of the above OR more than one of the above

3. A certain test measures both reading and writing scores on a 0–10 scale. An investigator collects test from a simple random sample of 100 students. The observed values of reading test score minus writing test score are roughly normal, with a mean of -0.5 and standard deviation of 1.

- (a) Calculate and interpret a p-value for the data under the hypothesis that there is no difference between reading and writing scores.
- (b) Calculate and interpret a 96% confidence interval for the difference between reading test score and writing test score.