

S:25 Lecture/Practice Problems for Hypothesis Testing #21
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For each problem compute the test statistic, the p-value (level of significance) & conclusion (not significant, significant, highly significant)

1. In the preceding five years, entering students at Coldwell University had an average SAT verbal score of 612 points. A simple random sample of 100 students is taken from this year's entering class. The average SAT verbal score for these students is 594 points, with an SD of 80 points.

Does this data indicate a decline in the verbal scores of entering students?

2. A drug company claims that it has developed a drug that will be effective for more than 60% of the patients suffering from hypertension. When 50 such patients are given the drug, it is effective for 34 of them. What do you conclude?

Suppose the drug is effective for 136 of 200 patients.

#21b

3. The city of Smithville claims that more than 60% of the cars on I-61 are speeding as they cross the Smithville city limit. We wish to test the null hypothesis: 60% of the cars are speeding vs. the alternative hypothesis: $> 60\%$ are speeding

400 cars are clocked. 272 are speeding.

4. A battery company claims that its AA battery can run a lab device for more than 40 minutes. We wish to test

the null hypothesis: the average life of all such batteries is 40 min. vs.
the alternative hypothesis: the average life of all such batteries is > 40 min.

100 batteries are tested. average life = 40.8 min., SD = 4.8 minutes.

What if average life = 41.2 min., SD = 4.8 minutes.

What if average life = 41.2 min., SD = 8.4 minutes.

#21c

5. We wish to test: the null hypothesis: the average weight of all family size boxes of ACME breakfast cereal is 15 ounces vs. the alternative hypothesis: the average weight of family size boxes is less than 15 ounces

A random sample of 256 family size boxes of ACME breakfast cereal average 14.8 ounces with standard deviation .6 ounce

6. A random sample of 64 ACME employees commute an average of 4.1 miles to work with standard deviation 1.6 miles. The company administrators claim that the average for all employees is only 3.8 miles and that the average of 4.1 miles found in the sample just reflects chance error. What do you think?

#21d

7. We wish to test the null hypothesis: the percentage of all students at City University who own a laptop computer is 28% vs the alternative hypothesis: this percentage is $> 28\%$

A simple random sample of 400 students was taken at City University. It was found that 118 of them had a laptop computer.

8. We wish to test the null hypothesis: the average weight of all parcels shipped by a certain mail order company in November was 6.0 lbs.
vs the alternative hypothesis: the average weight was less than 6.0 lbs.

A simple random sample of 144 parcels shipped by the company in November was selected for inspection. The average weight of the 144 parcels was 5.9 lbs. and the standard deviation of their weights was 2.1 lbs.