Practice Final Exam
Stat 202 Solutions

1. Statcourse 8 data
Columns refer to same student

(a) Use paired t-test

Which test did students do better
Use Stat, Summary Stats, Columns
"First", "Second", "Mean"

First 150.5
Second 156 ← better on Second

Is there evidence to support claim that all 1432 students did better on that exam?

Stat → T Stats → Paired

Second
First } pvalue = 0.2279

Not significant at traditional level!

(b) Two sections taught separately, different professors different students

Use two sample - t-test

T stat → two sample - with data

Second / First > $p = 0.3546$

Not significant at traditional level

(c) May not find evidence because sample size is too small and therefore power to find alternative hypothesis is low.

When the power to detect alternative is not 1, there is a chance you will not find alternative, When the power is low this chance is high.

To get better power use a sample size that is much larger.

2.

a) Null hypothesis $H_0: \mu = 530$

b) Alternative hypothesis $H_a: \mu \neq 530$

c) (i) One sample t-test

(ii) test statistic - one sample t statistic

(iii) If null hypothesis is correct this test statistic has distribution $t(44)$ (t distribution with 44 degrees of freedom) (because sample size is 45)

d) Two sided alternative because you didn't have any reason to expect before seeing data, whether the scores have increased or decreased,

e) Stat → T-Stats → One sample → with summary

Sample Mean 540
Sample Std 80
Sample Size 45

$H_0: \mu = 530$

pvalue
0.4063
Not significant at traditional level

(f) Power of test to detect 540 = .13
Significance of test = 0.05 = α

IF true mean is 530

Probability we accept Ho is $1-\alpha = .95$

g) If true mean is 540, probability accept null hypothesis
= 1 − probability we accept Ha
= 1 − power(540)
= 1 − .13
= .87

(h) Confidence Interval, from

Stat → T stats → One Sample → with Summary
Enter Same Stats
Pick Confidence Interval

Confidence Level 0.99

(507.89271, 572.10729)

(i) Yes we can be confident at the 99% level that the mean SAT score has not increased to 600.

Significance test

$H_0: \mu = 600$

$\alpha = 0.01$

Rejects null hypothesis because outside of interval

(j) 200 samples of size 45
99% confidence interval

How many contain true mean? On average?

$200 \times 0.99 = \boxed{198}$

3. Ten throws
Seven correct predictions
Probability of a correct prediction 0.5
Assuming she does it by chance

Stat → Proportion Stats → One Sample

→ with Summary

Sucesses [7]

Obs [10]

Perform Hypothesis test for p

$H_0: p = .5$

↑ chance

(in this case default)

$p = .2059$

(b) Not significant at $\alpha = 0.05$

No solid evidence she performs as claims

p97

(4) 154 students
85 dieters

Stat → Proportion Stats →
→ one sample → with summary

95% Confidence interval

(.473, .630)

(5)

95 men	104 women
10 lefties	15 lefties

Stat → ~~Summary~~ Proportion Stats
→ two Sample → with Summary

$H_0: p_1 - p_2 = 0$

pvalue 0.4074 [Not significant at traditional significance level (0.05)]