Quiz Key Practice Exam 3

(1) Proportions $n=50$ $X=35$ $\hat{p}=\frac{35}{50}=0.7$

Critical value of $Z^* = 1.96$

$$0.7 \pm 1.96\sqrt{\frac{.7(.3)}{50}}$$

$0.7 \pm 1.96(0.065)$

$0.7 \pm 0.127 \Rightarrow 0.573$ to 0.827

Using STAT > ~~Calc~~ TEST > 1-PropZInt

$(0.57298, 0.82702)$

We are 95% confident the true percentage of her students registered to vote is between 57.3% to 82.7%.

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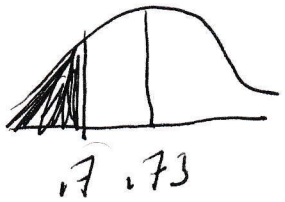
(2) Proportions $50(.73) > 10$ $50(.27) > 10$ Random

& ok to run a 1 prop z test

$H_0: p = 0.73$ The claim

$H_1: p < 0.7$



Test statistic $z = \frac{.7-0.73}{\sqrt{\frac{.73(.27)}{50}}} = \frac{-0.03}{0.063} \rightarrow -0.48$

p-value = .316

@ the 5% level of sig. we fail to reject H_0

2 continued from the "flow chart"

There is not sufficient evidence to warrant the rejection of the claim that the true percentage of students @ this school who are registered to vote is different from the national percentage or something like that.

(3) $n = \left(\frac{1.96\,(.73)(.27)}{.04}\right)^2 \approx 94$

(4) State that the percentage of students registered to vote in her class is lower than the Gallup Poll results, when really the students are just as politically active (the same percent registered to vote) as the national figure.

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(5) Claim: The percentage of Black americans who can't afford healthcare is lower than the national percentage

Conditions: Random ✓

$801(.28) > 10$
$801(.72) > 10$ ✓

$H_0: P = .28$

$H_a: P < .28$ or maybe $P \neq .28$ Claim

5 continued

$$Z = \frac{.38 - .28}{\sqrt{\frac{.28(.72)}{801}}} \rightarrow \frac{.1}{.016} \rightarrow 6.30$$

P-value essentially 0 whether a Two Tailed Test or a one Tailed Test. Reject H_0 The Sample data support the claim that the percentage of Black Americans who can't afford health care is different than the National percentage or something like that.

(6) Failing to reject h_0 when we should Failing to say that the proportion of Black Americans that can afford Healthcare is NOT different from All Americans, when actually this proportion is different.

(7) $$0.38 \pm 1.96\sqrt{\frac{.38(.72)}{801}}$$

$$0.38 \pm 0.036 \rightarrow (0.344, 0.416)$$

We are 95% Confident the True ~~proportion~~ Percentage of Black Americans who have not been able to afford health care during the past year is between 34.4% to 41.6%

(8) $n = \left(\frac{1.96\ (.25)}{.03}\right)^2 = 267$

(9) Two proportion Z-Test

Random, Both Samples

Claim: Higher rate of illiteracy among men in Qatar

$H_0: P_m = P_w$

$H_1: P_m > P_w$ The claim

$X_m = 45$ $X_w = 42$

$n_m = 234$ $n_w = 251$

using Software: Rossman-Chance 2 proportion

Graphing Calc STAT > TEST > 6: 2-Prop Z Test

Test statistic $Z = 0.72$

$p\text{-value} = 0.2369$

@ $\alpha = 0.05$ Fail to reject H_0

There is not sufficient sample evidence to support the claim that a higher rate of illiteracy exist among men in Qatar.

(10) Matched Pairs 2 Dependent Samples

Condition CK Random Sample ✓

We don't know about Normality ∴ $n < 30$

There are concerns about this test

Does C.L.T. hold?

$H_0: \mu_d = 0$

$H_1: \mu_d < 0$ ← does anxiety decrease post course?

The Claim:

1-sample T-Test on differences

$\bar{x}_d =$

Test Statistic $T = -3.92$

p-value $= .00067985$ pretty small

@ any level of significance

Reject H_0

The sample data support the claim that taking a statistics course does decrease anxiety about statistics.

(11) Conditions Ok

2 - independent samples 2 sample T-Test

Random Together more than 30 data points so probably Ok to use Test

Claim: Avg beats/min for dance songs is smaller than Avg beats/min for Top 200 ?

H_0: $\mu_D = \mu_{Top}$ 2 sample T-Test

H_1: $\mu_D < \mu_{Top}$ claim

Test Statistic

$T = -1.45$

p-value = 0.079 @ 5% level of significance

Fail to reject H_0

There is not sufficient sample evidence to support the claim that there are fewer beats per minute, on average, in Dance Music vs Top 200 music.

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(12) Categorical variable χ^2 GOF Test $n = 325$

H_0: Grade distribution is as expected

H_1: H_0 False

Test Statistic $\chi^2 = 62.5$ p-value = 0

Reject H_0
The sample data supports the claim that this semester's grade distribution does not match the historic record.

Expected
$A's = 48.7$
$B's = 97.5$
$C's = 130$
$D's = 32.5$
$F's = 16.25$

(13) Two-way-Table Categorical variables

χ^2 TEST for independence

No counts < 5

Expected Counts

	P.P	Made-4-U	25-hour
Rejected	57.7	51.5	61.8
Perfect	85.0	79.9	91.1
Acceptable	25.3	22.6	27.1

H_0: No association between ~~manufacturer~~ Vendor & Quality of Part

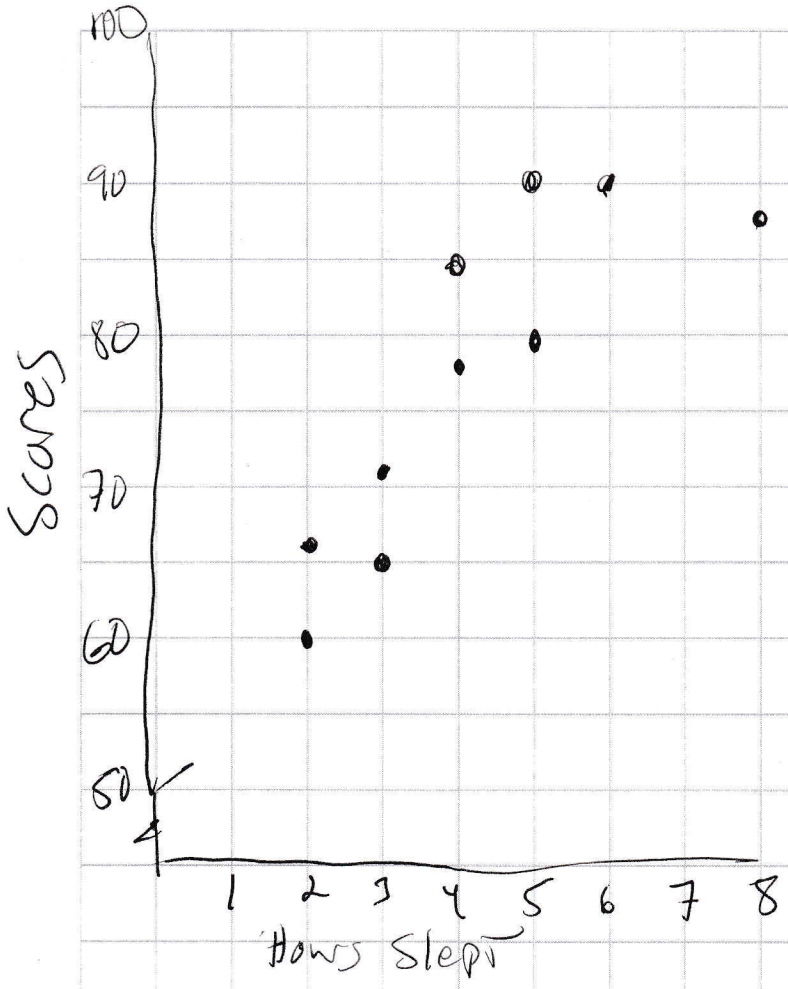
H_1: H_0 false (the claim)

TEST STAT

$\chi^2 = 7.410$ p-value $= 0.116$

Fail to reject H_0 @ $\alpha = 0.05$ level.

There is not sufficient sample evidence to support and claim that the defect rate is different at any one company.



$r = 0.85$

$r^2 = 72\%$

$\widehat{\text{Score}} = 5.04(\text{Hours Slept}) + 56.1$

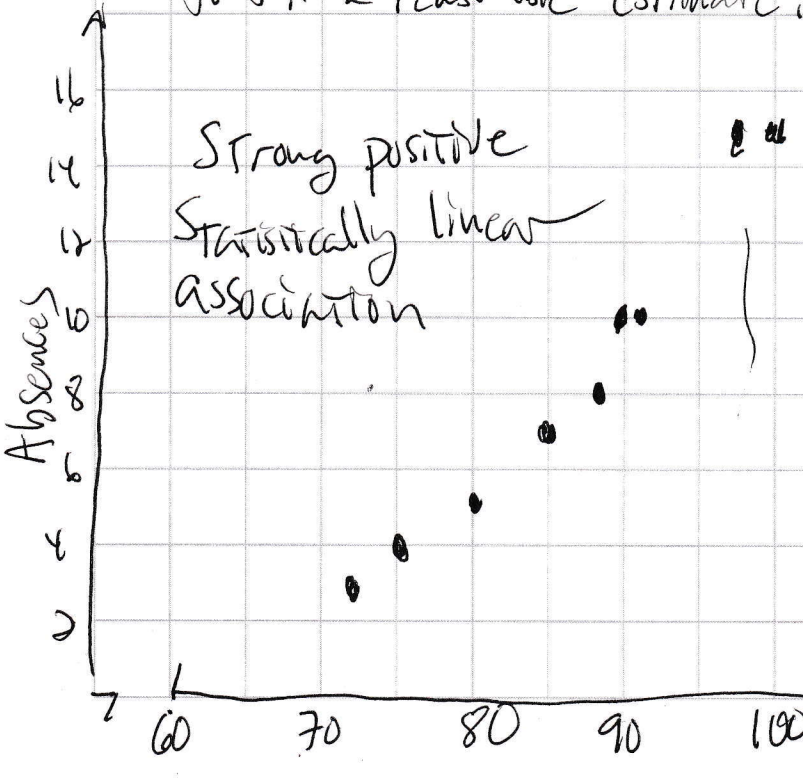
for 7 hrs

$5.04(7) + 56.1$

91.38

Not an example of extrapolation as x is inside collected data range.

We see a strong positive linear association. r is statistically significant @ the 5% level. I'm fairly confident this is a reasonable estimate.



$r = 0.98$ $r^2 = 96\%$

$\widehat{\text{Absences}} = 0.449\,\text{Distance} - 30.3$

For 40 min

$-12.34 = .449(40) - 30.3$

Yes an example of extrapolation 40 mins is outside the range of collected Data. — # Absences doesn't make Sense.

Linear model does not hold