

AP Statistics –Chapter 9 Review (updated 2025)	Name:
Goal: Review MC and Free Response	Date:

Chapter 9 MC Instructions

→ Selected MC questions from the entire chapter. Make sure you know how to do these!!!!

Chapter 9 Free Response Instructions

Required work for CI problems: define the parameter, name the test, check the conditions, provide a completely labeled normal graph, write the CI formula with the plugins, simplify the CI formula with the point estimate $\pm$ ME, write CI: [__, __], and answer in context.

Required work for TOH problems: define the parameter, H_0 , H_a , α , name the test, check the conditions, provide a completely labeled H_0 normal graph, the sample statistics, test statistic, p-value in a probability statement, and answer in context.

Chapter 9 Free Response

(textbook)TPS T9.11a pg598

STEP 1

p = true proportion of customers who would pay \$100 for a software upgrade

$$H_0: p = 0.20$$

$$H_A: p > 0.20$$

$$\alpha = 0.05$$

Name: 1 sample Ztest for proportions

STEP 2

Conditions:

R: random sample of 60 customers

I: $n = 60 \leq \frac{1}{10}$ (all customers)

$$N: 60(.2) = 12 \geq 10 \checkmark$$

$$p_0 = 0.20 \rightarrow 60(.8) = 48 \geq 10 \checkmark$$

Sample stats

$$n = 60$$

$$\hat{p} = 16/60 = 0.267$$

$$p_0 = 0.20$$

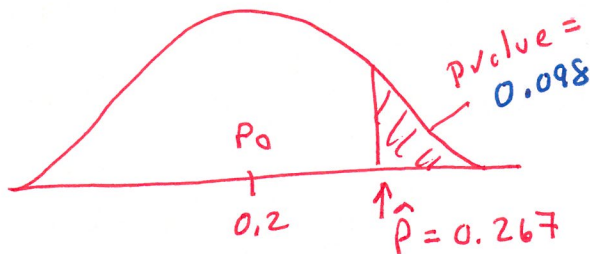
$$Z = 1.29$$

$$p\text{value} = P(Z > 1.29) = 0.098$$

STEP 3

Since the $p\text{value}$ (0.098) is Greater than $\alpha = 0.05$
We fail to reject H_0 . WE DO NOT HAVE convincing evidence to conclude more than 20% of these software customers will pay \$100 for an upgrade.

Remember
To H use p_0 +
CI's use $\hat{p}$



Chapter 9 Free Response

(textbook) TPS R9.5a pg595

STEP 1

P = true proportion of red slots

$$P_0 = 18/38 = 0.474 \rightarrow H_0: P = 0.474 \text{ (fair)} \quad \alpha = 0.05$$
$$H_A: P \neq 0.474 \text{ (unfair)}$$

Name: 1 sample Z-test for proportions

STEP 2

Conditions:

R: random sample of 50 spins

I: $n = 50 \leq \frac{1}{10}$ (all possible spins)

$$N: \begin{array}{l} 50(.474) = 23.7 \geq 10 \checkmark \\ 50(.526) = 26.3 \geq 10 \checkmark \end{array}$$

$P_0 \rightarrow$

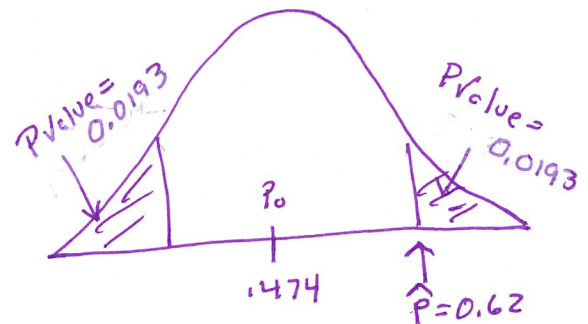
Sample stats

$$n = 50$$

$$\hat{p} = 31/50 = 0.62$$

$$Z = 2.07$$

$$p\text{value} = 2 \cdot P(Z \geq 2.07) = 0.0386$$



STEP 3

Since the pvalue (0.0386)
is less than $\alpha = 0.05$,
We reject H_0 .

We have convincing evidence the true proportion of spins that land on red is NOT 0.474. AND CAN conclude the roulette wheel is unfair

Chapter 9 Free Response

(textbook) TPS T9.11a pg 598

→ TPS T9.13b pg 599

STEP 1

μ = the true mean amount spent on food by household in this city

$$H_0: \mu = \$158$$

$$H_a: \mu \neq \$158$$

$$95\% \text{ CI} \rightarrow \alpha = 0.05$$

TEST: 1 sample t-interval for means

STEP 2

R: random sample of 50 HH's

I: $n = 50 \leq \frac{1}{10}$ (all HHs in this city)

N: $n = 50 \geq 30 \rightarrow$ CLT applies

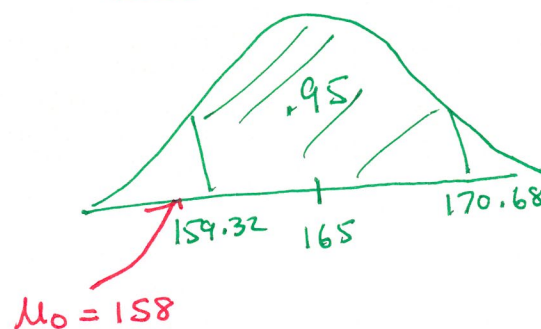
STATS

$$n = 50$$

$$\bar{x} = 165$$

$$95\% \text{ CI } [159.32, 170.68]$$

MUST Give Graph!!



STEP 3

We are 95% confident the true mean spent on food is between \$159.32 and \$170.68.

Since this interval does not include the population mean (\$158), we reject H_0 ^{at $\alpha = 0.05$} and have

convincing evidence the mean amount spent on HHs in this city differs from the U.S. average of \$158.

Chapter 9 Free Response

(textbook) TPS R9.5 pg595 – now compare your 2 tail test to a CI

- Parameter of Interest: same as TOH

- Confidence Level: 95% (1-0.05)

- Choice of Test: 1 sample Z-interval for Proportions

- List any Conditions that different for doing this CI

R+I are the same

$\hat{p} = 0.62$ $N: \begin{array}{l} .62(50) = 31 \geq 10 \checkmark \\ .38(50) = 19 \geq 10 \checkmark \end{array}$

- Provide Statistics and sketch CI Normal Graph.

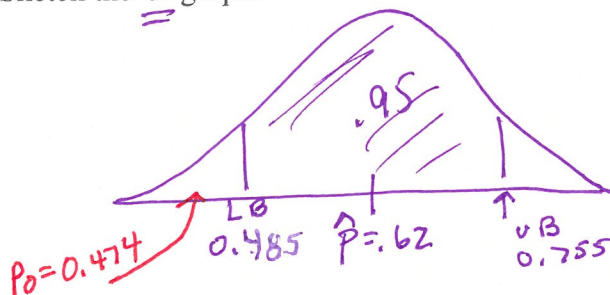
$n = 50$

$\hat{p} = 31/50 = 0.62$

$p_0 = 0.474$

$CV = Z^* = \pm 1.96$

- Sketch the CI graph:



- Use TICalc to find Confidence Interval – label Normal Graph. $\rightarrow$ CI: [0.485, 0.755]

- Interpret CI

We are 95% confident that the TRUE PROPORTION of spins that land on red is between 0.485 to 0.755

- Use your interval to decide whether ~~this company should be investigated for fraud.~~ the roulette wheel is unfair

Since the interval [0.485, 0.755] does NOT include the true proportion of red (0.474), we reject H_0 at $\alpha = 0.05$.

* AGAIN THE CI determines the roulette wheel is NOT fair.

Chapter 9 Free Response

(textbook)TPS 9.72 pg588

STEP 1

μ = TRUE MEAN AMOUNT OF HEAT CONDUCTIVITY
FOR THIS TYPE OF GLASS

$$H_0: \mu = 1$$

$$H_A: \mu > 1$$

$$\alpha = 0.05$$

Name: 1 sample t-test for means

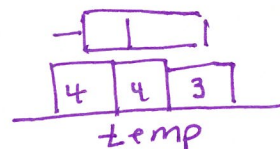
STEP 2

CONDITIONS

R: random sample of 11 pieces of glass

I: $n = 11 \leq \frac{1}{10}$ (all glass)

N: small sample. Graph shows
No outliers and approx. symmetric

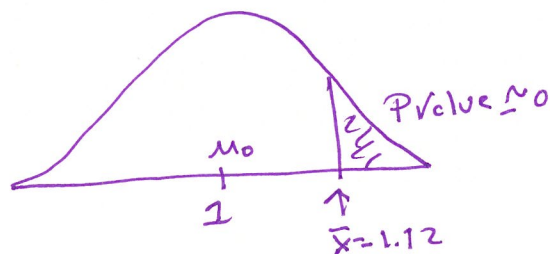


Sample stats:

$$\bar{x} = 1.12$$

$$s_x = 0.04$$

$$n = 11$$



Test Stats: $t = 8.95$
 $P_{\text{value}} = P(t \geq 8.95) \approx 0$

STEP 3

Since the pValue (≈ 0)
is less than $\alpha = 0.05$,
we Reject H_0

We have convincing evidence the true mean
amount of heat conductivity for this
type of glass is greater than 1 Watts/m²/°C.