**AP Stats: Inference Guidelines Remember to always use PANIC or PHANTOMS during inference!**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | One or Two? | Procedure | Model  chart to use | Parameter use in Ho | Estimate from sample | Formula  for CI or test statistic | Assumptions/Conditions | Calculator  STAT 🡪TESTS |
| **Proportions**  Find z\* on t-distribution at row in Confidence Level specified | One sample | 1-proportion z-interval |  |  |  |  | Independent  Random  < 10% of population  np 10 and nq 10 | A: 1-Prop ZInt |
| 1-proportion z-test |  | 5: 1-Prop ZTest |
| Two independent groups | 2-proportion z-interval |  |  |  | Independent  Random  < 10% of population  Independent groups  np 10 and nq 10 for both groups | B: 2-Prop ZInt |
| 2-proportion z-test | Where | 6: 2-Prop ZTest |
| **Means**  With    For 2 groups, use df on calc | One sample | t-interval |  |  |  |  | Independent  Random  < 10% of population  Nearly Normal | 8: TInterval |
| t-test |  | 2: T-Test |
| Two independent groups | 2-sample t-interval |  |  |  | Independent (from each other)  Random  Nearly Normal or large n  Independent groups | 0: 2-SampT int |
| 2-sample t-test |  | 4: 2-SampT Test |
| Matched pairs | Paired t-interval |  |  |  | Paired data  *Differences* in pairs are independent  Random  *Differences* nearly Normal | 8: TInterval |
| Paired t-test |  | 2: T-Test |
| **Distributions**  Categorical | One sample | Goodness of fit |  |  |  | df = # of categories – 1 | Counted data  Independent cells  Random  Exp counts | D: GOF-Test |
| Many groups | Homogeneity | df = (rows – 1)(columns – 1) | C: -Test  MATRIX 🡪 EDIT [A](obs) & [B](exp) |
| **Independence/Association** categorical | Many groups | Independence | Same as above, plus…  < 10% of population |
| **Association**  slope  quantitative | One sample | Linear-Regression conf. interval |  |  |  | df = n–2 | Straight Enough  Quantitative Data  Random/Independent  Random Residual Plot  Nearly Normal/No outlier  Check histogram of residuals | G: LinRegT Int |
| Linear regression t-test | df = n–2 | F: LinRegT test |

**PANIC**

**P** = Parameters (DEFINE VARIABLES)

**A** = Assumptions (EXPLAIN)

**N** = Name of Interval

**I** = Interval (WORK)

**C** = Conclusion (IN CONTEXT)

**PHANTOMS**

P = Parameters (DEFINE VARIABLES)

H = Hypothesis (Ho, Ha)

A = Assumptions (EXPLAIN)

N = Name of Test

T = Test statistic (WORK)

O = Obtain p-value

M = Make Decision

S = State Conclusion (IN CONTEXT)

**Sample Size**

to find the sample size, always use Margin of Error

**Errors**

Type I: Null is true, but we reject it

Type II: Null is false, but we fail to reject it

**All Formulas are set up as**

CI = statistic (critical value)(standard error)

z or t =

**Hypotheses for Tests**

* 1-proportion z-test
  + Ho: value
  + Ha: value
* 2-proportion z-test
  + Ho:
  + Ha:
* 1-sample t-test
  + Ho: value
  + Ha: value
* 2-sample t-test
  + Ho:
  + Ha:
* Matched pairs t-test
  + Ho:
  + Ha:
* goodness of fit
  + Ho: \_\_\_ are uniformly distributed
  + Ha: \_\_\_ are not uniformly distributed
* test of homogeneity
  + Ho: \_\_\_ have the same distribution across \_\_\_\_\_\_(categories).
  + Ha: \_\_\_ do not have the same distribution.
* test for independence
  + Ho: \_\_\_ and \_\_\_ are independent.
  + Ha: \_\_\_ and \_\_\_ are not independent.
* Linear Regression t-test
  + Ho: There is no association between \_\_\_ and \_\_\_.
  + Ha: There is an association between \_\_\_ and \_\_\_.