Distribution of midterm quizzes:



Average – 65.2

Frequently Asked Questions!

Explain in your own words - the **Central Limit Theorem**

Def’n: Technically, for any set of independent, randomly distributed variables, the distribution of the standard deviations (or means, it turns out – even though our book says stdev’s) approximates a standard normal variable*. Intuitively, standardizing any random variable that itself is a sum or average of a set of independent random variables results in a new variable that is nearly the same as a standard normal one.*

Significance: This allows us to use statistical tools that require our sample observations to be drawn from a sample space that is normally distributed, even though the data themselves might not be normally distributed.

Only caveats are that the sample size must be “large enough”, and the observations themselves must be independent (and technically drawn from a distribution with common variance).

See pp 53-55 in text.

**Other critical terms:**

* Law of Large Numbers
* Type I and Type II errors
* p-value

Match the following terms with their appropriate definitions:

|  |  |
| --- | --- |
| The squared deviation of each group mean  from the overall mean (multiplied by n) | Answer 1  |
| The squared deviation of each observation  from its appropriate group mean | Answer 2  |
| The squared deviation of each observation  from the overall mean | Answer 3 |

Match the following null hypotheses with their appropriate parametric analyses:

|  |  |
| --- | --- |
| All communities are similar | Answer 1  |
| There is no difference between two means | Answer 2  |
| There is no linear relationship between the two variables | Answer 3  |
| All slopes are zero | Answer 4  |
| The variances are equal | Answer 5  |
| All means are equal | Answer 6  |
| The sample was taken from a normal distribution | Answer 7  |
| The slope of the line is zero |  |

* All communities are similar – Multi-response Permutation Procedure,
* There is no difference between two means – t-test,
* There is no linear relationship between the two variables – Correlation,
* All slopes are zero – Multiple linear regression,
* The variances are equal – Levene's test,
* All means are equal – ANOVA,
* The sample was taken from a normal distribution – Shapiro-Wilks test,
* The slope of the line is zero – Regression

Match the following types of statistical analyses with the appropriate metric to Resample or Shuffle (repeat the calculation 1000+ times):

|  |  |
| --- | --- |
| Comparing two means | Answer 1  |
| Determining linear relationships (potentially a causal relationship) | Answer 2  |
| Comparing many means | Answer 3  |
| Determining linear relationships (not causal) | Answer 4  |

* Comparing two means
* Shuffle DIF (difference between means),
* Determining linear relationships (potentially a causal relationship)
* Resample Slope,
* Comparing many means
* Shuffle SSamong,
* Determining linear relationships (not causal)
* Shuffle Correl

Which of the following is NOT an assumption of Resampling analyses?

Select one:

a. The test statistic describes the pattern of interest

b. The data come from a population with a known distribution

c. The randomization procedure creates an appropriate null distribution for the question

d. The data collected represent random, independent samples

An F-ratio for a one-way ANOVA is the ratio of what over what?

Select one:

a. MSamong / MStotal

b. MStotal / MSamong

c. MSamong / MSwithin 

d. MSwithin / MStotal

Which of the following contains the two assumptions of ANOVA?

Select one:

a. Partitioning variance among groups is accurate and samples were collected randomly

b. Variances among groups are homogeneous and the samples come from normally distributed populations

c. The SS-Total is an accurate measure of group level variability and groups are good

d. The sum of all values in a dataset is equal to the overall mean which is unbiased

If I run an ANOVA, am I finished with my analyses?

Select one:

a. Yes, but usually after ANOVA you should run regressions

b. No, after ANOVA you should run Shaprio-Wilk and Levene's tests

c. No, all you know is that all the groups are not equal - next you need to run post hoc tests

d. Yes, now you know that all groups are different from one another