Started on	Sunday, April 21, 2019, 10:24 PM
State	Finished
Completed on	Sunday, April 21, 2019, 11:36 PM
Time taken	1 hour 11 mins
Grade	**173.67** out of 218.00 (**80**%)

Question 1

Correct

10.00 points out of 10.00

Given the conversion data for two treatments A and B, match each of the variables with the corresponding calculated value (Choose the closest value, in case of the rounding errors)

Outcome	Price A	Price B
Conversions, X	42,480	42,551
Sample size, n	50,332	49,981

The point estimate of the conversion rate for group A, $\hat{p}_A$	0.844 ✔
The point estimate of the conversion rate for group B, $\hat{p}_B$	0.851 ✔
The combined conversion rate, p	0.8477 ✔
The observed difference in proportions, $\hat{p}_B - \hat{p}_A$	0.007 ✔
The value of the Z-statistic	3.09 ✔
If the p-value for the Z-statistic is 0.0021, then there is only a Y% chance that the observed difference is due to random chance, with Y =	0.2 percent ✔
Price B increases conversion above price A in a statistically significant way. True or False?	True ✔
Price A increases conversion above price B in a statistically significant way. True or False?	False ✔

Your answer is correct.

The correct answer is: The point estimate of the conversion rate for group A, $\hat{p}_A$ → 0.844, The point estimate of the conversion rate for group B, $\hat{p}_B$

→ 0.851, The combined conversion rate, p
→ 0.8477, The observed difference in proportions, $\hat{p}_B - \hat{p}_A$

→ 0.007, The value of the Z-statistic → 3.09, If the p-value for the Z-statistic is 0.0021, then there is only a Y% chance that the observed difference is due to random chance, with Y = → 0.2 percent, Price B increases conversion above price A in a statistically significant way. True or False? → True, Price A increases conversion above price B in a statistically significant way. True or False? → False

Question 2

Partially correct

6.67 points out of 10.00

In December 2010, a commercial polling organization sampled 200 US voters and found that only 72 voters, 36%, rated President Obama's handling of the economy positively---as good or excellent.

Use the provided R simulation code, to assess the effects of changes to the re-sampling procedure.

Instead of using 200 as the sample size, using 36 ones and 64 zeros for the sample size of 100 would produce comparable conclusions about the reliability of the 36% point estimate. True or False? ✔	True
The size of the re-sample drawn from the *hat* (using sample() method) must be equal the original sample size, i.e. the size of the *hat.* True or False? ✔	True
When dealing with proportions and percentages, such as illustrated in the provided example R code, using the hat size of 100 can be helpful because a 100 matches nicely to percentages. such a simplification does not adversely affect the validity of the conclusions drawn about the robustness of the point estimate. ✖	False

Your answer is partially correct.

You have correctly selected 2.

The correct answer is: Instead of using 200 as the sample size, using 36 ones and 64 zeros for the sample size of 100 would produce comparable conclusions about the reliability of the 36% point estimate. True or False? → True, The size of the re-sample drawn from the *hat* (using sample() method) must be equal the original sample size, i.e. the size of the *hat.* True or False? → True, When dealing with proportions and percentages, such as illustrated in the provided example R code, using the hat size of 100 can be helpful because a 100 matches nicely to percentages. such a simplification does not adversely affect the validity of the conclusions drawn about the robustness of the point estimate. → True

Question 3

Correct

4.00 points out of 4.00

Answer the questions for the given psychological experiment.

A psychologist conducted an experiment with two groups of subjects to explore the power of suggestion and arbitrary reference points. The subjects in both groups were asked to write down their maximum bid for an item on eBay. First, though, the subjects in the treatment group were asked to look up the weather report for the next day and to note the forecast temperature. The resulting differences between the two groups appeared to suggest that the treatment did, in fact, have an effect on bid price - focusing on the temperature, even though it was irrelevant, skewed the bid price. The alpha level was 0.05 and the p-value was 0.07.

Is this a hypothesis test or a confidence interval question?	Hypothesis Testing ✔
Is this a correct interpretation of p-value: it not low enough to meet the threshold established for statistical significance before the study was done.	True ✔
What is the threshold for statistical significance established for this study?	5% ✔

Your answer is correct.

See the Glossary of terms

The correct answer is: Is this a hypothesis test or a confidence interval question? → Hypothesis Testing, Is this a correct interpretation of p-value: it not low enough to meet the threshold established for statistical significance before the study was done. → True, What is the threshold for statistical significance established for this study? → 5%

Question 4

Correct

10.00 points out of 10.00

Assess whether these situations call for a one-tailed or two-tailed test.

The intelligence of people is measured as a score on an IQ test. Can a specific set of drill-study exercises increase the IQ score of a person?	One-tailed ✔
ABC pizzeria claims that on average, each of their large pepperoni pizzas is topped with two ounces of pepperoni. Many customers have lodged a complaint against them saying that the actual amount of pepperoni used is considerably less than that. So measurements of pepperoni weight are taken on some pizzas.	One-tailed ✔
In a typical population, platelet counts are expected to range from 140 to 440 (thousands of platelets per cubic millimeter of blood). The platelet counts of a group of elderly women are observed to see if their counts are abnormal.	Two-tailed ✔
The pH of the catalyst in a chemical reaction is measured by a standard titration procedure. For the reaction to proceed at the desired rate, the pH of the catalyst should be close to 6.4. A chemist wishes to test whether the pH is different from 6.4 by taking some readings.	Two-tailed ✔
Blood pressures of a group of patients were measured before and after a full meal. Does blood pressure increase, on average, after the intake of a full meal?	One-tailed ✔
A manufacturer of pipe wants to test whether a special coating can retard the corrosion rate of pipes used in laying underground electrical cables. He coats some pipes with a new plastic and takes relevant readings on them after 1 year to check whether the plastic coating is beneficial.	One-tailed ✔
A contractor buys cement from a manufacturer. The cement bags are supposed to weight 94 pounds. The contractor wants to test whether he is getting his money's worth, so he measures the weights of a sample of cement bags.	One-tailed ✔
A drug is tested to determine whether it can lower the blood glucose level of diabetic rats. One group of rats is given the drug and the other group is used as control, which is not given the drug. The two groups' blood glucose levels are measured to test the drug's effectiveness.	One-tailed ✔
We want to test whether the heart weights of male and female cats differ significantly. Therefore, the heart weights of a group of male and female cats are measured.	Two-tailed ✔

The number of defectives in a group of articles from two different factories is observed. We want to test whether the product of the second factory is superior to that of the first factory.

One-tailed ✔

Your answer is correct.

The correct answer is: The intelligence of people is measured as a score on an IQ test. Can a specific set of drill-study exercises increase the IQ score of a person? → One-tailed, ABC pizzeria claims that on average, each of their large pepperoni pizzas is topped with two ounces of pepperoni. Many customers have lodged a complaint against them saying that the actual amount of pepperoni used is considerably less than that. So measurements of pepperoni weight are taken on some pizzas. → One-tailed, In a typical population, platelet counts are expected to range from 140 to 440 (thousands of platelets per cubic millimeter of blood). The platelet counts of a group of elderly women are observed to see if their counts are abnormal. → Two-tailed, The pH of the catalyst in a chemical reaction is measured by a standard titration procedure. For the reaction to proceed at the desired rate, the pH of the catalyst should be close to 6.4. A chemist wishes to test whether the pH is different from 6.4 by taking some readings. → Two-tailed, Blood pressures of a group of patients were measured before and after a full meal. Does blood pressure increase, on average, after the intake of a full meal? → One-tailed, A manufacturer of pipe wants to test whether a special coating can retard the corrosion rate of pipes used in laying underground electrical cables. He coats some pipes with a new plastic and takes relevant readings on them after 1 year to check whether the plastic coating is beneficial. → One-tailed, A contractor buys cement from a manufacturer. The cement bags are supposed to weight 94 pounds. The contractor wants to test whether he is getting his money's worth, so he measures the weights of a sample of cement bags. → One-tailed, A drug is tested to determine whether it can lower the blood glucose level of diabetic rats. One group of rats is given the drug and the other group is used as control, which is not given the drug. The two groups' blood glucose levels are measured to test the drug's effectiveness. → One-tailed, We want to test whether the heart weights of male and female cats differ significantly. Therefore, the heart weights of a group of male and female cats are measured. → Two-tailed, The number of defectives in a group of articles from two different factories is observed. We want to test whether the product of the second factory is superior to that of the first factory. → One-tailed

Question 5

Correct

4.00 points out of 4.00

A 95% confidence interval for a mean:

Select one:

- a. Is wider than a 99% confidence interval.
- b. Is wider when the sample size is larger.
- c. In repeated samples will include the true population mean 95% of the time. ✔
- d. Will include 95% of the observations of a sample.

Your answer is correct.

The correct answer is: In repeated samples will include the true population mean 95% of the time.

Question 6

Correct

4.00 points out of 4.00

In a survey of 625 registered U.S. voters, 55% respond that they support health care reform. What is the 95% confidence interval for the true percentage of U.S. registered voters who support health care reform?

Select one:

- a. 50%-60%
- b. 55%-60%
- c. 51%-59% ✔
- d. 49%-47%

Your answer is correct.

The correct answer is: 51%-59%

Question 7

Correct

4.00 points out of 4.00

In a randomized trial of two drugs to treat depression (drug A and drug B), depressive symptoms decreased significantly in patients in both drug groups ($p<.01$ for group A and $p<.05$ for group B). It follows that:

Select one:

- a. Drug A and drug B are equally effective.
- b. Drug B is superior to drug A.
- c. Drug A is superior to drug B.
- d. None of the above ✔

Your answer is correct.

The correct answer is: None of the above

Question 8

Incorrect

0.00 points out of 5.00

A study was conducted to examine the peer review process. The investigators hypothesized that reviewers suggested by authors would give more favorable reviews than reviewers picked by journal editors. They obtained data on 40 manuscripts that had been reviewed by 1 author-suggested and 1 editor-suggested reviewer. They obtained the following results:

Calculate the exact two-sided p-value associated with this outcome (calculate the exact binomial probability).

	Author-suggested reviewer	
Editor-suggested reviewer	**Favorable (accept/revise)**	**Unfavorable (reject)**
Favorable (accept/revise)	10	2
Unfavorable (reject)	8	20

Select one:

- a. 0.021
- b. 0.043
- c. less than .0001
- d. 0.051
- e. 0.109 ✖

Your answer is incorrect.

The correct answer is: 0.021

Question 9

Correct

5.00 points out of 5.00

A study was conducted to examine the peer review process. The investigators hypothesized that reviewers suggested by authors would give more favorable reviews than reviewers picked by journal editors. They obtained data on 400 manuscripts which had been reviewed by 1 author-suggested and 1 editor-suggested reviewer. They obtained the following results.

What statistical tests would be most appropriate to analyze these data?

	Author-Suggested Reviewer	
Editor-Suggested Reviewer	**Favorable (accept/revise)**	**Unfavorable (reject)**
Favorable (accept/revise)	100	30
Unfavorable (reject)	70	200

Select one:

- a. ANOVA
- b. Difference in proportions test.
- c. Paired ttest.
- d. McNemar's chi-square test ✔
- e. Relative risk.

Your answer is correct.

The correct answer is: McNemar's chi-square test

Question 10

Incorrect

0.00 points out of 4.00

A study was conducted to examine the peer review process. The investigators hypothesized that reviewers suggested by authors would give more favorable reviews than reviewers picked by journal editors. They obtained data on 400 manuscripts which had been reviewed by 1 author-suggested and 1 editor-suggested reviewer. They obtained the following results.

Which are the relevant numbers that should be compared to determine whether author-suggested reviewers are more likely to give a favorable review?

	Author-Suggested Reviewer	
Editor-Suggested Reviewer	**Favorable (accept/revise)**	**Unfavorable (reject)**
Favorable (accept/revise)	100	30
Unfavorable (reject)	70	200

Select one:

- a. 30 vs. 70
- b. 100 vs. 200 ✖
- c. 30 vs. 200
- d. 30/130 vs. 70/270

Your answer is incorrect.

The correct answer is: 30 vs. 70

Question 11

Correct

5.00 points out of 5.00

I divide my study population into smokers, ex-smokers, and never-smokers; I want to compare the proportions of each group that went to graduate school. What test should I use, assuming that I do not have sparse data?

Select one:

- a. One-way ANOVA.
- b. Paired ttest.
- c. Repeated-measures ANOVA.
- d. Difference in proportions test.
- e. Chi-square test. ✔

Your answer is correct.

The correct answer is: Chi-square test.

Question 12

Correct

5.00 points out of 5.00

Confidence intervals give information about which of the following?

Select one:

- a. The size of the effect.
- b. The precision of the estimate.
- c. Statistical significance.
- d. All of the above ✔

Your answer is correct.

The correct answer is: All of the above

Question 13

Incorrect

0.00 points out of 4.00

Suppose that a survey estimate is "48% yes" for some proposition. If the confidence interval is 44%-52%, then the margin of error is:

Select one:

- a. 48% ± 4%
- b. 4% ✖
- c. 8%
- d. 48% ± 8%

Your answer is incorrect.

The correct answer is: 48% \(\pm \) 4%

Question 14

Incorrect

0.00 points out of 3.00

Suppose we take a random sample of 100 women and form a 90% confidence interval for the true mean height. If we then did the same thing, but sampled both men and women (rather than women-only), would the new confidence interval be wider or narrower than the original?

Select one:

- a. Narrower
- b. Wider
- c. It is impossible to predict ✖

Your answer is incorrect.

The correct answer is: Wider

Question 15

Correct

3.00 points out of 3.00

Suppose we take a random sample of 50 people and form a 90% confidence interval for the true mean height. If we then did the same thing, but sampled 100 people rather than 50, would the new confidence interval be wider or narrower than the original?

Select one:

- a. Narrower ✔
- b. Wider
- c. It is impossible to predict

Your answer is correct.

The correct answer is: Narrower

Question 16

Partially correct

7.00 points out of 10.00

Used Toyota Sales Prices: You are given a small sample of the real Toyota resale prices of the used cars in Euro, yet the real population size is about 20,000.

You are asked to report answers to the following questions by selecting the proper choices after implementing the Bootstrap simulation. You are allowed to use boot:boot() and boot::boot.ci() functions in R.

The incorrect answers are penalized.

Select one or more:

- [x] a. The average sale price is 17,685 Euros ✔
- [ ] b. The average sale price is 15,685 Euros
- [x] c. The sample average is within 90% confidence interval. ✔
- [x] d. The 90% confidence interval is between approximately 16,000 and 19,000. ✔
- [ ] e. The 90% confidence interval is between approximately 14,000 and 17,000.
- [ ] f. The sample size used for Bootstrap simulation should be 20
- [ ] g. The sample size used for Bootstrap simulation should be 200
- [x] h. The sample size used for Bootstrap simulation should be 20,000 ✖
- [ ] i. The sample average is outside the 90% confidence interval.

Your answer is partially correct.

You have correctly selected 3.

Here is the example R code that solves this problem

The correct answers are: The average sale price is 17,685 Euros, The sample average is within 90% confidence interval., The 90% confidence interval is between approximately 16,000 and 19,000., The sample size used for Bootstrap simulation should be 20

Question 17

Correct

4.00 points out of 4.00

Which of the following would decrease the width of a confidence interval?

Select one:

- a. Changing from a 99% to 95% confidence level. ✔
- b. Increasing the variability of the outcome.
- c. Decreasing the sample size.
- d. Changing from a 90% to 95% confidence level.

Your answer is correct.

The correct answer is: Changing from a 99% to 95% confidence level.

Question 18

Correct

4.00 points out of 4.00

Which of the following would decrease the width of a confidence interval?

Select one:

- a. Changing from a 99% to 95% confidence level. ✔
- b. Increasing the variability of the outcome.
- c. Decreasing the sample size.
- d. Changing from a 90% to 95% confidence level.

Your answer is correct.

The correct answer is: Changing from a 99% to 95% confidence level.

Question 19

Correct

5.00 points out of 5.00

In a cross-sectional study of heart disease and gender in middle-aged men and women, 10% of men in the sample had prevalent heart disease compared with only 5% of women in the sample. After adjusting for age in multivariate logistic regression, the odds ratio for heart disease comparing males to females was 1.1 (95% confidence interval: 0.79—1.43). What conclusions can you draw?

Select one:

- a. Age is a confounder of the relationship between gender and heart disease. ✔
- b. Being male increases your risk of heart disease.
- c. The men in the study are younger than the women in the study.
- d. Age modifies the effect of gender on heart disease.
- e. The study had insufficient power to detect an effect.

Your answer is correct.

The correct answer is: Age is a confounder of the relationship between gender and heart disease.

Question 20

Correct

5.00 points out of 5.00

Which of the following is an example of correlated observations? Choose at least one.

Select one or more:

- [ ] a. Patients randomly assigned to treatment were compared with patients randomly assigned to control.
- [ ] b. Patients with a disease were compared with a group of disease-free controls.
- [x] c. A group of treated patients was compared with their pre-treatment values. ✔
- [ ] d. A group of exposed individuals was compared with a group of unexposed individuals.
- [x] e. A group of cases were compared with sibling controls. ✔

Your answer is correct.

The correct answers are: A group of treated patients was compared with their pre-treatment values., A group of cases were compared with sibling controls.

Question 21

Correct

4.00 points out of 4.00

In a randomized controlled trial comparing a drug and a placebo pill, the drug was found to yield a superior cure rate (p=.02). It follows that:

Select one:

- a. The effect size must be large.
- b. The effect was measured precisely.
- c. There is only a 2% chance that the observed difference in cure rates could have arisen if the drug had no effect. ✔
- d. There is a 2% chance that the drug has no effect.

Your answer is correct.

The correct answer is: There is only a 2% chance that the observed difference in cure rates could have arisen if the drug had no effect.

Question 22

Correct

4.00 points out of 4.00

Researchers in Britain attempted to determine whether babies who are exposed to X-rays while in the womb have an increased risk of certain childhood cancers. The odds ratio for myeloid leukemia, comparing babies exposed to in utero X-rays versus babies not exposed was: 2.44 (0.95 to 6.33), p>.05. What conclusions should we draw?

Select one:

- a. In utero X-rays do not increase a baby's risk of myeloid leukemia, since this result is not statistically significant.
- b. Babies exposed to in utero X-rays may have as much as a 6-fold increased risk of myeloid leukemia. ✔
- c. In utero X-rays are safe.
- d. In utero X-rays are harmful.

Your answer is correct.

The correct answer is: Babies exposed to in utero X-rays may have as much as a 6-fold increased risk of myeloid leukemia.

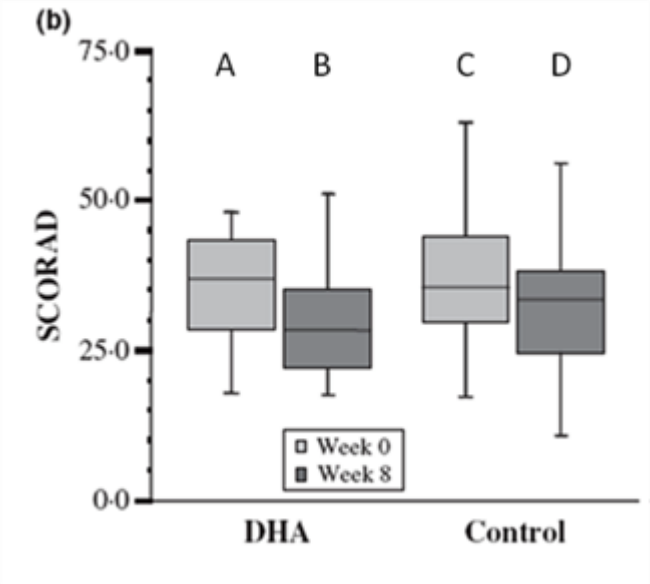
Question 23

Correct

5.00 points out of 5.00

What test should be used to determine whether DHA is a better treatment than control for treating eczema (SCORAD is not normally distributed)?

Use the following figure to answer the question: Figure 3b (British J Derm 2008) comes from a randomized trial of DHA versus a placebo pill for treating eczema. The figure shows boxplots of the eczema severity score, SCORAD, at baseline and week 8 for each group. SCORAD score is not normally distributed and the sample size is small.



Select one:

- a. A paired t-test that compares A and B.
- b. A Wilcoxon sign-rank test that compares B and D.
- c. Wilcoxon sign-rank tests comparing A with B and C with D.
- d. A Wilcoxon sum-rank test that compares the difference between A and B with the difference between C and D. ✔
- e. A chi-square test that compares B and C.

Your answer is correct.

The correct answer is: A Wilcoxon sum-rank test that compares the difference between A and B with the difference between C and D.

Question 24

Correct

4.00 points out of 4.00

For a survey of 625 people, what is the margin of error?

Select one:

- a. ±3 percentage points
- b. ±2 percentage points
- c. ±4 percentage points ✔
- d. ±5 percentage points

Your answer is correct.

The correct answer is: ±4 percentage points

Question 25

Correct

4.00 points out of 4.00

Researchers compared the nutritional habits of athletes with stress fractures to athletes without stress fractures. They considered 25 nutritional factors measured with a food frequency questionnaire and 25 nutritional factors measured using 24-hour dietary recall. They reported that vitamin K (as measured on the food frequency questionnaire only) was significantly lower (p=.02) in fractured athletes; and dietary fat (as measured by dietary recall only) was significantly higher (p=.03) in fractured athletes than non-fractured athletes. What conclusions should we draw?

Select one:

- a. Low vitamin K intake and high dietary fat intake may be causally related to fracture in athletes.
- b. Low vitamin K and high dietary fat intake are related to fractures in athletes, but the association may not be causal.
- c. The significant associations observed between vitamin K and high dietary fat and fractures are most likely chance findings ✔
- d. We should immediately begin supplementing athletes with vitamin K and recommending that they consume lower fat diets based on the results of this study.

Your answer is correct.

The correct answer is: The significant associations observed between vitamin K and high dietary fat and fractures are most likely chance findings

Question 26

Correct

4.00 points out of 4.00

I want to compare serum vitamin D levels between three independent groups (n=10 each), but vitamin D levels are not normally distributed. What should I do?

Select one:

- a. Don't worry about it—run an ANOVA anyway.
- b. Use a Kruskal-Wallis (non-parametric) ANOVA. ✔
- c. Nothing, I can't do anything with these data.
- d. Run 3 nonparametric ttests.

Your answer is correct.

The correct answer is: Use a Kruskal-Wallis (non-parametric) ANOVA.

Question 27

Correct

4.00 points out of 4.00

The non-parametric equivalent to the paired ttest is the:

Select one:

- a. Wilcoxon rank-sum test.
- b. Wilcoxon sign-rank test. ✔
- c. Mann Whitney-U test.
- d. Kruskal-Wallis test

Your answer is correct.

The correct answer is: Wilcoxon sign-rank test.

Question 28

Incorrect

0.00 points out of 4.00

The term "non-parametric" means?

Select one:

- a. Not normally distributed.
- b. Non-traditional. ✖
- c. Exotic
- d. No parameters are estimated; thus, you get p-values but no estimates of effect size.

Your answer is incorrect.

The correct answer is: No parameters are estimated; thus, you get p-values but no estimates of effect size.

Question 29

Correct

5.00 points out of 5.00

I want to compare serum vitamin D levels between three independent groups (n=10 each), but I'm not sure if vitamin D levels are normally distributed. What should I do?

Select one:

- a. Don't worry about it—run an ANOVA anyway.
- b. Test vitamin D levels for normality. ✔
- c. Use a Kruskal-Wallis (non-parametric) ANOVA.
- d. Nothing, I can't do anything with these data.
- e. Run 3 nonparametric ttests.

Your answer is correct.

The correct answer is: Test vitamin D levels for normality.

Question 30

Correct

4.00 points out of 4.00

Check the normality assumption of politics by plotting an histogram. What do you conclude from the plot only:

Use the following dataset.

-ID represents the ID of the student

-Coffee is the number of cup of consume per day

-Varsity=1 is they were part of the varsity team back in undergrad. Varsity=0 if not

-Milk is the number of cup of milk consumed per day

-Exercise is the number of hours spend per week exercising

-Wakeup is the time they usually wake up in the morning on week days

-Fruits is the number of fruit eaten per day

-Politics is a grade between 0 and 100. The higher the grade is the more democrat you consider yourself.

-Obama, Clinton, Bushjr, Bushsr, Regan, Carter is a grade between 0 and 100. The higher the grade is, the more you like this president.

-Mathlove, Writinglove is a grade between 0 and 100. The higher the grade is, the more you like Math/Writting

-Optimism is a grade between 0 and 100. The higher the grade is, the more optimistic you consider yourself

-Alcohol is the number of drinks you consume on a usual saturday night

-Sleep is the number of hour you sleep per night

-IsBookSmart=1 if you consider yourself book smart. IsBookSmart=0 if you consider yourself street smart

-Homework is the number of hours you spend on homeworks per week

-Healthcare is a grade between 0 and 100. The higher the grade is, the more you like ObamaCare reform

Select one:

- a. Yes, politics is normally distributed
- b. No, politics is not normally distributed ✔

Your answer is correct.

The correct answer is: No, politics is not normally distributed

Question 31

Correct

4.00 points out of 4.00

A randomized trial of two treatments for insomnia failed to show a statistically significant difference in improvement from insomnia (p-value =.50). It follows that:

Select one:

- a. The treatments are equally effective.
- b. Neither treatment is effective.
- c. The null hypothesis should be rejected.
- d. There is not enough evidence to reject the null hypothesis. ✔

Your answer is correct.

The correct answer is: There is not enough evidence to reject the null hypothesis.

Question 32

Correct

5.00 points out of 5.00

Which of the following is an assumption of one-way ANOVA?

Select one:

- a. The outcome variable is normally distributed.
- b. The variance of the outcome variable is the same in all groups.
- c. The groups are independent.
- d. All of the above. ✔
- e. None of the above.

Your answer is correct.

The correct answer is: All of the above.

Question 33

Correct

4.00 points out of 4.00

I am running a randomized controlled trial of 4 treatment regimens for high blood pressure (regimens A, B, C, and D). I compare blood pressures in the 4 groups using one-way ANOVA. My p-value is .03. I conclude:

Select one:

- a. All of the treatment regimens differ.
- b. Treatment A is better than all the rest.
- c. At least one treatment regimen is different from the others. ✔
- d. In pairwise comparisons, no treatment will be different.

Your answer is correct.

The correct answer is: At least one treatment regimen is different from the others.

Question 34

Incorrect

0.00 points out of 5.00

In a psychology experiment in which 50 volunteers were asked to read a paragraph about an engineer, 35 assumed that the engineer was male despite the fact that the paragraph did not specify gender (and avoided gendered pronouns such as “he” or “she”). If the null hypothesis here is that there is no gender bias, what is the two-sided p-value associated with this result? Use a normal approximation to solve this.

Select one:

- a. p=.0001
- b. p=.003 ✖
- c. p=.005
- d. p=.041
- e. p=.996

Your answer is incorrect.

The correct answer is: p=.005

Question 35

Correct

4.00 points out of 4.00

In a study that looked at 100,000 children, researchers found a highly significant inverse correlation (p<.0001) between blood sugar and IQ. What conclusions can we draw?

Select one:

- a. Eating too much sugar lower IQ in children.
- b. There is a strong association between sugar levels and IQ in children, but it might not be causal.
- c. This study provides strong evidence of an important relationship between blood sugar and IQ in kids.
- d. We should not draw any conclusions without knowing the size of the effect. ✔

Your answer is correct.

The correct answer is: We should not draw any conclusions without knowing the size of the effect.

Question 36

Correct

4.00 points out of 4.00

Researchers found that women who took drug X had a significant increase in bone density ($p<.05$). But women who took drug Y did not have a significant increase in bone density ($p>.05$). Which of the following statements follows?

Select one:

- a. Drug X is superior to drug Y at increasing bone density.
- b. We cannot conclude that drug X is superior to drug Y for improving bone density. ✔
- c. Drug X should be recommended over drug Y for women with low bone density.
- d. Women who took drug X had a larger increase in bone density than women who took drug Y.

Your answer is correct.

The correct answer is: We cannot conclude that drug X is superior to drug Y for improving bone density.

Question 37

Correct

4.00 points out of 4.00

Which of the following will yield a smaller p-value?

Select one:

- a. A smaller effect size.
- b. A smaller standard error. ✔
- c. A smaller sample size.
- d. Higher variability in the outcome.

Your answer is correct.

The correct answer is: A smaller standard error.

Question 38

Incorrect

0.00 points out of 4.00

In a study of depression, I measured depression score (a normally distributed variable) at baseline; 1 month; 6 months; and 12 months. What is the simplest statistical test that will tell me whether depression improved significantly between baseline and the end of the study?

Select one:

- a. Repeated-measures ANOVA. ✖
- b. One-way ANOVA.
- c. Two-sample ttest.
- d. Paired ttest.

Your answer is incorrect.

The correct answer is: Paired ttest.

Question 39

Correct

4.00 points out of 4.00

Which of the following elements does NOT increase statistical power?

Select one:

- a. Increased sample size
- b. Measuring the outcome variable more precisely
- c. A significance level of .01 rather than .05 ✔
- d. A larger effect size.

Your answer is correct.

The correct answer is: A significance level of .01 rather than .05

Question 40

Correct

4.00 points out of 4.00

What is statistical power?

Select one:

- a. The probability of getting a statistically significant result when the null hypothesis is true.
- b. The probability of getting a statistically significant result when the null hypothesis is false. ✔
- c. The probability of getting a non-significant result when the null hypothesis is true.
- d. The probability of getting a non-significant result when the null hypothesis is false.

Your answer is correct.

The correct answer is: The probability of getting a statistically significant result when the null hypothesis is false.

Question 41

Correct

5.00 points out of 5.00

In a study of depression, I measured depression scores (a normally distributed variable) in two groups (treatment and placebo) at baseline; 1 month; 6 months; and 12 months. What statistical test should I used to determine whether the treatment group differed from the placebo group in the change in depression over time?

Select one:

- a. Repeated-measures ANOVA ✔
- b. One-way ANOVA.
- c. Two-sample ttest.
- d. Paired ttest.
- e. Wilcoxon sum-rank test.

Your answer is correct.

The correct answer is: Repeated-measures ANOVA

Question 42

Incorrect

0.00 points out of 4.00

A recent headline read: "Study of 55 million people adds further evidence that patients admitted to hospital at weekends have higher mortality." When evaluating this study, which of the following statistical pitfalls should you worry most about?:

Select one:

- a. clinically insignificant, but statistically significant results
- b. insufficient statistical power
- c. the problem of multiple comparisons ✖
- d. the fallacy of comparing p-values

Your answer is incorrect.

The correct answer is: clinically insignificant, but statistically significant results

Question 43

Correct

2.00 points out of 2.00

If the null hypothesis is true (there is no effect), you cannot make a type II error.

Select one:

- a. True ✔
- b. False

Your answer is correct.

The correct answer is: True

Question 44

Correct

5.00 points out of 5.00

Investigators compared mean cholesterol level between 100 smokers and 100 unrelated non-smokers. Which of the following is likely the most appropriate statistical test for this comparison?

Select one:

- a. A two-sample t-test. ✔
- b. ANOVA
- c. A paired t-test.
- d. Chi-square
- e. Kaplan-Meier methods

Your answer is correct.

The correct answer is: A two-sample t-test.

Question 45

Incorrect

0.00 points out of 5.00

Investigators compared mean cholesterol level between 100 smokers and 100 unrelated non-smokers. The standard deviation of cholesterol in the smokers group was twice the standard deviation in the nonsmokers group. Which of the following is likely the most appropriate statistical test for this comparison?

Select one:

- a. A two-sample t-test with pooled variance ✖
- b. A two-sample t-test with unpooled variance
- c. A paired t-test.
- d. Chi-square
- e. Kaplan-Meier methods

Your answer is incorrect.

The correct answer is: A two-sample t-test with unpooled variance

Question 46

Correct

5.00 points out of 5.00

Investigators compared mean cholesterol level of 100 smokers before and after they quit smoking. Which of the following is likely the most appropriate statistical test for this comparison?

Select one:

- a. A two-sample t-test with pooled variance
- b. A two-sample t-test with unpooled variance
- c. A paired t-test. ✔
- d. Chi-square
- e. Kaplan-Meier methods

Your answer is correct.

The correct answer is: A paired t-test.

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