Question 1.
Everything else being equal, the following study will have the highest power
A B C D E F

A d = 2

B d = 1

C d = 0.5

D r = 0.5

E p = 0.04

F This is a trick question, power has nothing to do with effect size

Question 2.
"Tychenic mean" stands for _____
A B C D E

A the mean of an observed sample from a population

B the mean of a possible sample from a population

C the mean of the sample means

D the mean of the sample standard deviations

E None of the above.

Question 3.
The t-distribution approximates _____ with larger n
A B C D E

A Normal distribution

B Uniform distribution

C Abnormal distribution

D F distribution

E Gamma distribution

Question 4.
You are assessing the linear association between two normally distributed variables. What is the best statistics for you to compute?
A Kruskal-Wallis B Mann-Whitney U C ANOVA D t-test E Chi-Square

Question 5.
If you flip a coin four times, what is the probability of the following outcome sequence: Heads-Tails-Heads-Tails?
A 0.5 B 0.01 C 1 D 0.06 E 0.25

Question 6.
Linear regression finds the best regression line by _____
A B C D E F

A drawing a line that minimizes the sum of the distances of the data points to the line.

B drawing a line that minimizes the sum of the squared distances of the data points to the line.

C drawing a line that minimizes the sum of the vertical distances of the data points to the line.

D drawing a line that minimizes the sum of the squared vertical distances of the data points to the line.

E drawing a line that minimizes the sum of the horizontal distances of the data points to the line.

F drawing a line that minimizes the sum of the squared horizontal distances of the data points to the line.

Question 7.
Floater farmer visits a Fremen hall to procure Excalibur. With this in mind, You take the GRE to get into an academic program. The average score is 230.57 and the standard deviation is 48.17. You scored a 203.79. Your score is higher than _____ percent of all people who took this test.

A 28.913 B 95.0 C 9.638 D 50.0 E 14.456 F 20.0

Question 8.
A rational person who learned probability well should _____ in the Monty Hall TV show (assuming Monty Hall is fair).

A B C D

A always switch from the originally selected door

B always stick to the originally selected door

C switch from or stick to the original selected door under different circumstances

D never participate (because you can never win)

Question 9.
The main idea behind Principal Component Analysis (PCA) is to:

A B C D

A Reduce the number of a dimensions of a dataset

B Separate explained variance from unexplained variance

C Eliminate outliers

D Test if one has enough power

Question 10.
You recently acquired an egg, and are tending to it, in order to make it hatch. You'd prefer the egg to hatch in the morning rather than when you are asleep or when you are away at school. The times when the egg may hatch are _____

A B C D E

A mutually exclusive events.

B independent events.

C independent and mutually exclusive events.

D independent and identically distributed (i.i.d.) events.

E None of the above.

Question 11.
Use G*Power to calculate the sample size needed for a two tailed paired-samples t-test with a known effect size of 0.24, an alpha of 0.05, and a beta of .2.

A 109 B 13 C 24 D 210 E 139 F 215

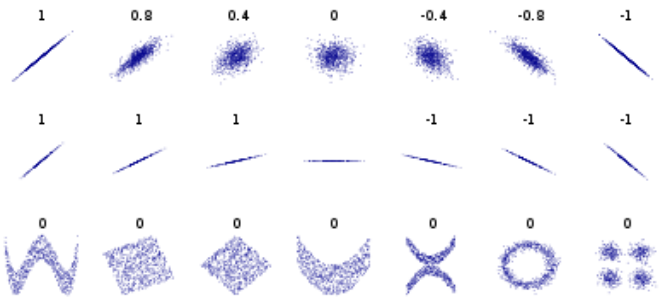

Figure 1: Correlation plot.

Question 12.
Please look at the figure Correlation plot. We can see that _____ (see Fig - 1)

A B○ C○ D○ E○ F○

A Correlation of 0 implies statistical independence.

B Statistical independence implies a correlation of 0.

C Any positive correlation is always stronger than any negative correlation.

D A zero correlation is always stronger than any negative correlation.

E Correlation is a meaningful metric to describe covarying relations between any two variables.

F None of the above.

Question 13.
Effect sizes tell us _____
A B○ C○ D○ E○

A How large the p-value is

B How much power our study has

C How much an effect matters for individual people

D The false positive rate

E The false negative rate

Question 14.
You want to determine the effect of a tutoring intervention for college students. You randomly assign college students to either receive tutoring or not. You want to know if tutoring affects performance for freshmen, sophomores, juniors, and seniors differently. To find this out, you will have to run a _____ ANOVA.
A 2 x 4 B○4 x 1 C○3 x 4 D○2 x 3 x 2

Question 15.
The mode of a sample is always _____ the mean of the sample.
A larger than B○equal to C○smaller than D○different from E○None of the above

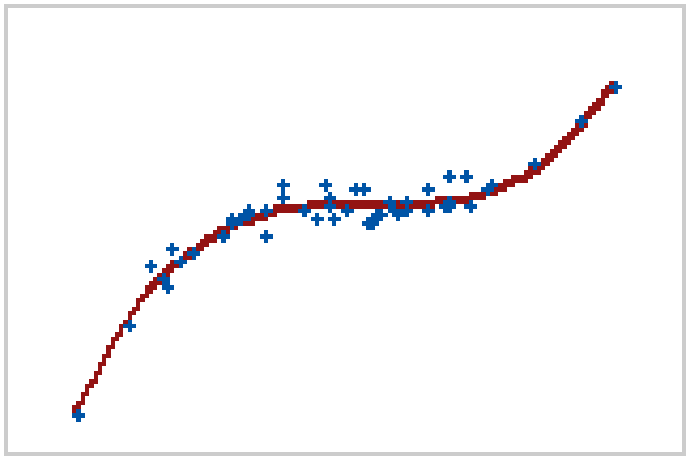

Figure 2: Dots and a curve.

Question 16.
What kind of relationship does the correlation in this image (refer to the Dots and a curve figure) show? (see Fig - 2)

A Negative linear B ◯ Negative monotonic C ◯ Positive linear D ◯ Positive monotonic

Question 17.
The positive predictive value is the _____
A B ◯ C ◯ D ◯

A Pre-study probability that a result is true

B Post study probability that a result is true

C Alpha level

D Type II error rate

Question 18.
5 Kzer-Za starships are orbiting Vela 9204, along with 10 Ilwrath starships. Having said that, You have 9 gadgets in your abode. Each of them has a probability of failing of 0.08 per year. Assuming they fail randomly and independently of each other, what is the probability that at least one of them will fail in any given year?
A 95.0 B ◯ 54.634 C ◯ 50.0 D ◯ 109.269 E ◯ 5.0 F ◯ 27.317

Question 19.
You run a matched-pairs t-test to see if patients who underwent therapy for depression report feeling better after the treatment. In this case, the null hypothesis states that _____
A B ◯ C ◯ D ◯

A There is no difference between depression scores before treatment and depression scores after treatment

B There is no correlation between depression scores before treatment and depression scores after treatment

C There is a difference between depression scores before treatment and depression scores after treatment

D There is no difference between each individual participant who underwent treatment, and the rest

Question 20.

You are studying the relationship between smoking and cardiovascular health. You find that these are correlated at a r = - 0.84. While notifying your team of your findings, your colleague says, "what about their family history of heart disease?". What is your next step?

A B C

A Find the relationship between smoking and family history by correlating the residuals found in smoking and cardiovascular health and cardiovascular health and family history and partialing out cardiovascular health.

B Find the relationship between smoking and cardiovascular health by correlating the residuals found in smoking and family history and cardiovascular health and family history and partialing out family history.

C Find the relationship between family history and cardiovascular health by correlating the residuals found in smoking and family history and cardiovascular health and smoking and partialing out smoking.

Question 21.

In an ANOVA with 3 factors, in the full model, you would have this many interaction terms:

A 1 B 2 C 8 D 4 E 6

Question 22.

Which of the following statements is true about confounding variables?

A B C D E F

A Controlling is essentially getting confounds out of the way (eliminating them as alternative explanations)

B We can effectively mitigate the effects of confounds via experiments.

C We can use multiple linear regression to control for confounds.

D We can use partial correlation to control for confounds.

E All of the above.

F None of the above.

Question 23.

In multiple linear regression, beta_____ refers to

A B C D E F

A The slope of the line

B The value of Y when X = 1

C The value of Y when X = 0

D The correlation coefficient

E All of the above

F None of the above

Question 24.

What does it mean if two events are negatively correlated?

A B C D

A They decrease together

B They increase together

C As one increases, the other decreases

D They are unrelated

Question 25.
You study how many times students ask questions during class. You look at your data from 100 students and notice that it is not normally distributed: most students don't ask questions at all, but there are 3 students who ask 10 to 20 questions per class. The best measure of central tendency to represent this data would be:
A The mean B ◯ The median C ◯ The mode D ◯ The standard deviation E ◯ The range

Question 26.
In PCA, the Kaiser criterion indicates that factors with an eigenvalue of _____ or above should be kept
A 1 B ◯ 2 C ◉ 5 D ◯ 0

Question 27.
In a 5x5 ANOVA, each factor has _____ levels.
A B ◯ C ◯ D ◯

A 5
B 2
C 10
D There are no levels, only factors

Question 28.
You want to develop a drug to increase IQ. So far, you have created 4 candidate substances - A, B, C and D. They all shifted the group IQ mean (tested on 30 volunteers each) away from the population mean. You calculated the following parameters A: z-score of 2.5 (mean=137.5) B: Group mean = 115, SD = 15 C: Group mean = 130, SEM = 2 D: Group mean = 130, SEM = 4 Which of the 4 outcomes is most unlikely - and thus most promising to increase IQ?
A B ◯ C ◯ D ◯ E ◯ F ◯

A Substance A
B Substance B
C Substance C
D Substance D
E They are all equally (un)likely
F not enough information provided.

Question 29.
A group of 5 Elves enters the forest in order to defeat Lord British. Be that as it may, You run an experiment with a few conditions. There were 80, 30 and 30 people in each of the groups respectively. You analyze the data with a Chi squared test. The the degrees of freedom for the Chi squared test is?
A 1.0 B ◯ 2 C ◯ 1.0 D ◯ 4.0 E ◯ 3.0

Question 30.
You have recorded the heights and the IQ points of your classmates, and found that the covariance between the z-scores of the heights and IQ is 0.3. You can conclude _____
A B ◯ C ◉ D ◯ E ◯ F ◯

A the correlation is 0.3.
B the correlation is 0.7.
C the correlation is 0.09.
D the correlation is 0.3/(1-0.3).
E that we cannot know the correlation yet because we need to know the sample means and standard deviations too.
F None of the above.

Question 31.
One way to increase power is to?
A B○ C○ D○ E○

A Increase alpha
B Increase sample size
C Increase effect size
D All of the above
E None of the above

Question 32.
What two parameters define the normal distribution?
A B○ C○ D○ E○ F○

A Mean and standard deviation
B Median and standard deviation
C Mean and MAD
D Median and MAD
E All of the above
F None of the above

Question 33.
You want to study if NYU students tend to skip breakfast in the morning. You randomly sample 100 NYU students and ask them whether they skip breakfast or not. If you wanted to do a chi-square test to determine significance, what would the expected frequencies for each category (has breakfast vs. doesn't have breakfast) be?
A B○ C○ D○

A 50 in each category
B 25 in each category
C 30 in each category
D There are no categories, the expected frequency is 100

Question 34.
The best synonym for statistically significant is
A Unlikely B○Important C○Substantial D○Impossible E○Impossible

Question 35.
A troupe of 4 Elves searches the settlement in order to talk to Humbaba. Be that as it may, There are a lot of families in the town of Picklerick, and the number of children in a given family is unlike what's commonly seen in most parts of the galaxy. Families with no child, one child, two children, ..., six children are [12, 16, 22, 12, 12, 10, 16.00] percent of the families in the town respectively. Given these proportions, for a randomly selected child in this town, the chance for the child to have come from a family of 3 or more children is _____ percent.
A 5.0 B○0.397 C○1.586 D○50.0 E○95.0 F○0.793

Question 36.
You want to know whether people who have goatee are more perceived to be more sociable. As a student researcher, you only have funds to recruit 10 models. The most powerful design to reveal that there is a difference is to _____
A B○ C○ D○ E○ F○

A Randomly pick 5 models with goatee and 5 without goatee, ask people to rate them, then do a t-test for independent groups.
B Randomly pick 10 models with goatee, ask people to rate them before and after the goatee was shaved off then do a t-test for correlated groups.
C Randomly pick 5 models with goatee and 5 without goatee, ask people to rate them, then do a z-test.

D Randomly pick 10 models with goatee, ask people to rate them before and after the goatee was shaved off then do a z-test.

E This is a trick question. 10 models are not enough to show anything about anything.

F None of the above.

Question 37.

A researcher suspects that there is a confound, call it variable Z that mediates the correlation between variable X and variable Y. The researcher runs a partial correlation between X and Y, while controlling for Z. This correlation is obtained by _____

A B○ C○ D○

A Correlating X with Z

B Correlating Y with Z

C Correlating the residuals from the regression between X and Z with the residuals from the regression between Y and Z

D Decomposing the variance of Z

Question 38.

Partial correlation can be best described as:

A B○ C○ D○

A The log of the odds

B The proportion of the variance in your model

C The correlation between all of your independent variables.

D The correlation between two variables while controlling for another variable

Question 39.

You are doing a 2x7 ANOVA with 280 participants. You have _____ df within, _____ df between, and _____ df total.

A 13; 266; 279 B○ 266; 279; 13 C○ 266; 13; 279 D○ 13; 279; 266

Question 40.

You randomly sample 8 graduate students from an NYU event. 5 of the 8 exhibit higher IQ's than the median of the general population. The probability of obtaining this result by chance (if those graduate students do not differ in IQ from the general population) is _____

A 0.54 B○ 0.11 C○ 0.37 D○ 0.22 E○ 0.05

Question 41.

Two platinum drickens sit on a sign. This being the case, You see Hormet in the gym and make smalltalk. They tell you that they have 2 kids and one of them is a daughter. The probability that the other child is a son is _____

A 2/3 B◉ 0.25 C○ 0.2 D○ 0.167 E○ 0.5 F○ 0.6

Question 42.

You run a regression line to measure how well psychopathy predicts criminality. You find that the relationship between psychopathy and criminality is .78. This means that:

A B○ C○ D○

A For every one SD increase in criminality, psychopathy increases .78 SDs

B For every one SD increase in psychopathy, criminality increases .78 SDs

C For every one SD in criminality, psychopathy decreases .78 SDs

D For every one SD increase in psychopathy, criminality decreases .78 SDs

Question 43.

You recently acquired two eggs from a friend, and are tending to them in order to make them hatch. You'd prefer them to hatch in the morning rather than when you are asleep or when you are away at school. That these eggs may hatch in the same morning is _____

A B○ C○ D○ E○ F○

A mutually exclusive events.

B independent events.

C independent and mutually exclusive events.

D independent and identically distributed (i.i.d.) events.

E conditionally independent events

F None of the above.

Question 44.

When the sample standard deviation is known and the sample is small (<20), one can use a _____

A ANOVA B○t-test C○z-test D○None of the above

For the following questions, there will be a prompt, followed by one or a few questions based on that prompt. Each such block will be marked with a gray bar along the margin to the right.

We are concerned that large differences in the depression scores of the individuals within the two groups might have obscured the potential effectiveness of the drug. To alleviate this, we ran another small study where we measure the depression scores of people before (V1) or after (V2) they received Sadex. The results are reported in "Sadex2.txt".

Question 45.

How many participants are part of this new study in total?

A 15 B○30 C○60 D○90 E○120

For the following question, use the "Thanksgiving" data set. In column one are self-reported feelings about Thanksgiving (1 - don't care for the holiday; 5 - Love thanksgiving); the next 3 columns represent feelings about turkey (like or dislike); feelings about family(adore them or annoyed by them); and the role the participant has in the holiday (cook or relax)).

Question 46.

You run an ANOVA on this data. How many interaction effects are significant?

A 4 B○3 C◉2 D○1 E○0

Question 47.

You run the appropriate test for this kind of data. How many effects are significant?

A 1 B○2 C○3 D○All of the above E○None of the above.

For the following questions, use the "Moon & Aggression" data set to do the proper test statistic. This provides the number of disruptive behaviors by dementia patients during two different phases of the lunar cycle. Each row corresponds to one participant. Variables: Moon - The average number of disruptive behaviors during full moon days; Other - The average number of disruptive behaviors during other days.

Question 48.

What can you conclude from this data set?

A B C D

A The average number of disruptive behaviors among patients with dementia does not differ between moon days and other days

B It is less likely than chance that the average number of disruptive behaviors among patients with dementia does not differ between moon days and other days

C It is less likely than chance that the average number of disruptive behaviors among patients with dementia does differ between moon days and other days

D The average number of disruptive behaviors among patients with dementia does differ between moon days and other days

For the following questions, use the "College Success" data set. This provides high school grades, SAT scores, and Grade Point Average of 224 university students. Variables: id - Participant ID; gpa - Grade Point Average (GPA) after three semester in college; hsm - Average high-school grade in mathematics; hss - Average high-school grade in science; hse - Average high-school grade in English; satm - SAT score for mathematics; satv - SAT score for verbal knowledge;

Question 49.

What proportion of the variance in your model does average high school math, science and English grade account for?

A 0.1 B 0.2 C 0.3 D 0.4 E 0.5

For the following question, use the "Beer Goggles" data set. This provides median attractiveness ratings of 50 attractive or unattractive faces after consuming different amounts of alcohol. Variables: IV - FaceType - Attractiveness of the rated faces ('0' = unattractive, '1' = attractive) and Alcohol - Amount of alcohol consumed ('0' = Placebo group with 500 ml of non-alcoholic beer, '1' = Low-dose group with 500 ml of average strength beer (4 percent ABV), '2' = High-dose group with 500 ml of strong beer (7 percent ABV); DV - Attractiveness - Median of the 50 attractiveness ratings on a scale from 0 ("pass me a paper bag") to 10 ("pass me their phone number").

Question 50.

There are _____ total conditions.

A 2 B 6 C 3 D 5

Congratulations! You have finished the test.

To improve our class in the future, please help us fill out the short questionaire on the next page before uploading your examination.