Final Exam Study Guide

In a game show, a board with 30 spaces has prizes behind each space. The prizes have the following frequencies: 6 toasters, 1 car, 8 vacations, 10 dinner gift cards, and 5 empty soda cans.

What is the probability of selecting a door with a vacation?

> 0.267
>
> 8 vacation spaces out of 30 total spaces is 8/30 = .267

Which Boolean operator is associated with multiplying two different probabilities together?

- And

A single candy bar is pulled at the Mars plant for nutritional content testing out of every 300th batch of Snickers selected.

> Systematic sampling
>
> Since it is asking you to take every 300th Snickers, this is systematic sampling.

Is `the state you live in` a categorical, quantitative, or ordinal variable type?

> Categorical
>
> State is a category and not numeric, so it is categorical.

Is the following variable categorical, quantitative, or ordinal?

`The "hot" scale for peppers`

Ordinal

Because the rating is from hottest to least hot, the categorical data is ordered and thus ordinal.

If two events are independent, how do you calculate the probability of an "or" in the probability question?

Add the two individual probabilities

In a game show, a board with 30 spaces has prizes behind each space. The prizes have the following frequencies: 6 toasters, 1 car, 8 vacations, 10 dinner gift cards, and 5 empty soda cans.

What is the probability of selecting a door with anything except a soda can?

0.833

Because this is a "not" probability problem, you will add up everything BUT the 5 empty soda cans. So 6 + 1 + 8 + 10 = 25, and 25 / 30 (the total spaces) = .833.

Which of the following formulas will yield the mean in a spreadsheet program like MS Excel or Google Sheets?

.average()

Which of the following measures of distribution is the standard deviation squared?

Variance

What is the difference between the distribution of X and the distribution of x-bar?

The distribution of *x* is the population distribution, and the distribution of *x*-bar is the distribution of sample means

For a normally distributed variable with mean of 44 and standard deviation of 6, how much of the distribution is between 32 and 56, according to the 68-95-99.7 rule?

95%

Start by determining how many standard deviations away those numbers are. You can begin by adding the standard deviation to the mean once. 44 + 6 is 50. That's one standard deviation away. Then again, the standard deviation to the mean a second time: 50 + 6 = 56. So that makes two standard deviations on the top. Then start subtracting the standard deviation value from the mean to get how many standard deviations below 32 is. 44 - 6 is 38. That's one standard deviation. 38 - 6 is 32, so that's two standard deviations away. So you know that both the top and bottom values are two standard deviations away, and the 68-95-99 rule says that 95% of the distribution is between two standard deviations from the mean.

The following scenario is an example of what type of sampling?

The police department is starting to pay attention to their tickets to warnings ratio. So, they grab all of the patrol officers from the briefing area and ask them what they think the ratio is on their shift.

Convenience sampling

Since the briefing area was easy and convenient to the person briefing, and there was no methodology behind this sampling, this would be convenience sampling.

Is the following variable categorical, quantitative, or ordinal?

`The state you live in`

- Categorical

Which distribution would you use to examine the probability of an event happening in a certain period of time when the outcome is discrete?

Poisson Distribution

Which of the following is a requirement to run a Chi-Square test of independence?

- Expected cell count greater than 5

Which of the following is not a rule of probability?

Probability of an event can change depending on the outcome of a previous event

If *x* = 270, mu = 225, and the *z*-score is 1.5, what is sigma?

30

For this problem, you will need to use the z-score formula, plug in all the values, and then solve for sigma. The formula is z = (x - mu) / sigma, so when plugged in that is 1.5 = (270 - 225) / sigma. Bring sigma to the other side - now you have 1.5sigma = 45. Bring 1.5 over, so you have sigma = 45 / 1.5, and sigma = 30.

The following scenario is an example of what type of sampling?

People in Europe get asked whether they agree with a new monetary policy for the Euro. Twenty-two countries will participate in the survey, and the number of people surveyed in each country is proportional to the population in that country. That is, more populous countries will have a larger number of participants than less populated countries.

Stratified sampling

The keyword "proportional" clues you in that you have stratified sampling here.

Is the following variable categorical, quantitative, or ordinal?

`blood type`

- Categorical

What does the word "random" mean?

- All subjects have an equal probability of being chosen

If you have a population with a mu of 55 and a sigma of 21, what is the standard deviation of the distribution of *x*-bar if your sample size is 22?

4.48

You will use the formula to find the standard deviation of the child for this problem: sigma divided by the square root of the sample size. 21 / 4.69 rounds to 4.48.

For a distribution whose mean is 320 and sigma is 14, what is the probability of randomly selecting a single value of less than 317 or greater than 323?

0.8305

You will need to use the z score applet for this. Enter the mean and standard deviation, then choose outside and place the remaining two values in. The resulting area, or p value, is .83.

Look at the following situation, and determine which best describes the data conversion.

Using a stopwatch, a teacher measures the time it takes for each student's paper airplane to hit the ground after being dropped from the top of the bleachers. After counting 140 drops, the teacher reports the results in the following groups: "like a rock," "got lucky because of an updraft," and "would make Orville and Wilbur proud."

Quantitative to categorical

The actual stopwatch times would be quantitative, but they got put into the three fun and descriptive categories.

You roll three 6-sided dice. If exactly two of the dice show 5, what is the probability that the total is 11 or less?

0.200

Since only two dice can show five, this means that there are only 5 possibilities, not 6, for the last die - you can to exclude the 5. If you have 2 dice showing 5, that means 10 pips total (5 + 5 = 10), and if you need an 11, then 11-10 = 1 and the last die must show a 1. Since you can't have a 5, you have a 1 in 5 chance of getting 11, not 1 in 6.

When rolling a 6 sided die, what is the probability of rolling an even number or a number greater than or equal to 4?

4/6

This is an "or" probability problem and so you will need to add the probability of getting an even number (3/6) up with the probability of getting a number greater than or equal to 4 (3 / 6), which would be 6/6. You then subtract the overlap. Since 4 and 6 falls in both categories, remove them, so 6/6 becomes 4/6.

What is the purpose of creating a confidence interval?

It gives you a feel of where the true mean of a population is

The following scenario is an example of what type of sampling?

A new testing method is being investigated at Timpview high school. The investigation evaluates the students in both 3rd period American History class and the 5th-period Geography class.

Cluster sampling

The key here is the term "all students in each." Cluster sampling randomly selects groups and then takes everyone in that group.

For a given sample size and sigma, which is wider: the 90% confidence interval or the 95% confidence interval?

The 95% confidence interval, because there is more confidence so that the interval will be bigger

If a parent distribution has a mean of 160 and a standard deviation of 24, and you create a distribution of *x*-bar using samples of size 16, what are the mean and standard deviation of your distribution

Mean = 160, standard deviation = 6

The child distribution will always have the same mean as the parent, so the last three answers can be eliminated. The child standard deviation will always be smaller than the parent, so this is the only one that has a smaller deviation than the parent.

What data type(s) does a `Bar Graph` take?

Categorical

What data type(s) does a `Line Graph` take?

Continuous

What data type(s) does a `Box Plot` take?

Continuous

What data type(s) does a `Scatter Plot` take?

Continuous

What is the alternative hypothesis for an Independent Chi-Square?

The row and column variables are related

You run an Independent Chi-Square and get a *p* value of .90. How would you interpret this finding?

Accept the null hypothesis, since *p* is greater than .05.

What is the z-score if mu = 72 and sigma = 18?

There is not enough information given

You also need an *x* to calculate a *z* score.