

Question 1

The International Olympic Committee states that the female participation in the 2004 Summer Olympic Games was 42%, even with new sports such as weight lifting, hammer throw, and modern pentathlon being added to the Games. Broadcasting and clothing companies want to change their advertising and marketing strategies if the female participation increases at the next games. An independent sports expert arranged for a random sample of pre-Olympic exhibitions. The sports expert reported that 202 of 454 athletes in the random sample were women. Is this strong evidence that the participation rate may increase?

Was your test one-tail upper tail, lower tail, or two-tail? Explain why you choose that kind of test in this situation.

Answer: <https://biology-forums.com/index.php?topic=1934486>

Question 2

Baseball coaches use a radar gun to measure the speed of pitcher's fastball. They also record outcomes such as hits and strikeouts. The scatterplot below shows the relationship between the average speed of a fastball and the average number of strikeouts per nine innings for each pitcher on the Bulldogs, based on the past season.

Do you think there is a pattern? Describe the association between speed and the number of strikeouts.

Answer: <https://biology-forums.com/index.php?topic=1934363>

Question 3

Which of the following is not the job of a statistician?

- A) determining whether the conclusions drawn from a study are to be trusted
 - B) implementing new procedures based on the results of a study
 - C) collecting numerical information in the form of data
 - D) determining what information is relevant in a given problem
2. Storks Data show that there is a positive association between the population of 17 European countries and the number of stork pairs in those countries.

a. Briefly explain what positive association means in this context.

b. Wildlife advocates want the stork population to grow, and jokingly suggest that citizens should be encouraged to have children. As a statistician, what do you think of this suggestion? Explain briefly.

3. Two variables that are actually not related to each other may nonetheless have a very high correlation because they both result from some other, possibly hidden, factor. This is an example of

- A) an outlier.
- B) extrapolation.
- C) regression.
- D) leverage.

4. A correlation of zero between two quantitative variables means that

- A) re-expressing the data will guarantee a linear association between the two variables.
- B) none of these
- C) there is no association between the two variables.
- D) there is no linear association between the two variables.

5. Another company's sales increase by the same percent each year. This growth is . . .

A) logarithmic B) quadratic C) exponential D) power E) linear

6. A company's sales increase by the same amount each year. This growth is . . .

A) linear B) exponential C) power D) quadratic E) logarithmic

7. Which statement about influential points is true?

- I. Removal of an influential point changes the regression line.
- II. Data points that are outliers in the horizontal direction are more likely to be influential than points that are outliers in the vertical direction.
- III. Influential points have large residuals.

A) I and III B) I only C) II and III D) I, II, and III E) I and II

Answer: <https://biology-forums.com/index.php?topic=1698336>

Question 4

A college admissions counselor was interested in finding out how well high school grade point averages (HS GPA) predict first-year college GPAs (FY GPA). A random sample of data from first-year students was reviewed to obtain high school and first-year college GPAs. The data are shown below:

Is there evidence of an association between high school and first-year college GPAs? Test an appropriate hypothesis and state your conclusion in the proper context.

Answer: <https://biology-forums.com/index.php?topic=1934517>

Question 5

Pumpkin pie A can of pumpkin pie mix contains a mean of 30 ounces and a standard deviation of 2 ounces. The contents of the cans are normally distributed. What is the probability that four randomly selected cans of pumpkin pie mix contain a total of more than 126 ounces?

Answer: <https://biology-forums.com/index.php?topic=1934201>

Question 6

A biology professor responds to some student questions by e-mail. The probability model below describes the number of e-mails that the professor may receive from students during a day.

- How many e-mails should the professor expect to receive each day?
- What is the standard deviation?
- If it takes the professor an average of ten minutes to respond to each e-mail, how much time should the professor expect to spend responding to student e-mails each day?

Answer: <https://biology-forums.com/index.php?topic=1934408>

Question 7

How many different samples of size $n = 4$ can be selected from a population containing $N = 11$ elements?

A) 1,663,200 B) 330 C) 7920 D) 5040

Q. 2 A researcher identified 100 men over forty who were not exercising and another 100 men over forty with similar medical histories who were exercising regularly.

She followed all the men for several years to see if there was any difference between the two groups in the rate of heart attacks. This is a(n)

- retrospective study.
 - prospective study.
 - matched pairs experiment.
 - survey.
 - randomized experiment.
- Q. 3 The mean of Q_1 and Q_3 equals the

A) midrange. B) midquartile. C) median. D) mean.

Q. 4 In a cumulative less than distribution, the classes are labeled using

A) class marks. B) lower class limits. C) upper class limits. D) class boundaries.

Q. 5 _____ is obtained by partitioning the sampling units in the population into nonoverlapping subpopulations. Then random samples are selected from these subpopulations.

- simple random sample
 - systematic sample
 - stratified random sample
 - cluster sample
- Q. 6 Construct a 90 confidence interval for the population mean. Assume the population has a normal distribution.

In a recent study of 22 eighth graders, the mean number of hours per week that they played video games was 19.6 with a standard deviation of 5.8 hours. Round to the nearest hundredth.

A) (18.63, 20.89) B) (19.62, 23.12) C) (5.87, 7.98) D) (17.47, 21.73)

Q. 7 In a recent survey, 61 of the community favored building a health center in their neighborhood. If 14 citizens are chosen, find the probability that exactly 5 of them favor the building of the health center.

- 0.357
- 0.035
- 0.211
- 0.610

Answer: <https://biology-forums.com/index.php?topic=1698181>

Question 8

A professor has kept records on grades that students have earned in his class. If he wants to examine the percentage of students earning the grades A, B, C, D, and F during the most recent term, which kind of plot could he make?

A) dotplot B) histogram C) timeplot D) pie chart E) boxplot

Q. 2 Which of the following variables would most likely follow a Normal model?

- scores on an easy test

B) family income

C) heights of singers in a co-ed choir

D) weights of adult male elephants

E) all of these

Q. 3 School administrators collect data on students attending the school. Which of the following variables is quantitative?

A) whether the student is in AP classes

B) whether the student has taken the SAT

C) class (freshman, soph., junior, senior)

D) grade point average

E) none of these

Q. 4 Students taking an intro stats class reported the number of credit hours that they were taking that quarter. Summary statistics are shown in the table.

16.65

s 2.96

min 5

Q1 15

median 16

Q3 19

max 28

a. Suppose that the college charges 73 per credit hour plus a flat student fee of 35 per quarter. For example, a student taking 12 credit hours would pay $35 + 73(12) = 911$ for that quarter.

i. What is the mean fee paid?

ii. What is the standard deviation for the fees paid?

iii. What is the median fee paid?

iv. What is the IQR for the fees paid?

b. Twenty-eight credit hours seems like a lot. Would you consider 28 credit hours to be unusually high? Explain.

The five-number summary for midterm scores (number of points; the maximum possible score was 50 points) from an intro stats class is:

Min Q1 Median Q3 Max

16.5 32 39 43.5 48.5

a. Would you expect the mean midterm score of all students who took the midterm to be higher or lower than the median? Explain.

b. Based on the five-number summary, are any of the midterm scores outliers? Explain.

Q. 6 On Monday, a class of students took a big test, and the highest score was 92. The next day, a student who had been absent made up the test, scoring 100.

Indicate whether adding that student's score to the rest of the data made each of these summary statistics increase, decrease, or stay about the same:

a. mean

b. median

c. range

d. IQR

e. standard deviation

Answer: <https://biology-forums.com/index.php?topic=1698347>

Question 9

Truckers On many highways state police officers conduct inspections of driving logbooks from large trucks to see if the trucker has driven too many hours in a day. At one truck inspection station they issued citations to 49 of 348 truckers that they reviewed.

a. Based on the results of this inspection station, construct and interpret a 95% confidence interval for the proportion of truck drivers that have driven too many hours in a day.

b. Explain the meaning of "95% confidence" in part A.

Answer: <https://biology-forums.com/index.php?topic=1934203>

Question 10

The American Veterinary Association claims that the annual cost of medical care for dogs averages \$100 with a standard deviation of \$30, and for cats averages \$120 with a standard deviation of \$35.

a. Find the expected value for the annual cost of medical care for a person who has one dog and one cat.

b. Find the standard deviation for the annual cost of medical care for a person who has one dog and one cat.

c. Suppose that a couple owns four dogs.

i. Find the expected value for the annual cost of medical care for the couple's dogs.

ii. Find the standard deviation for the annual cost of medical care for the couple's dogs.

Answer: <https://biology-forums.com/index.php?topic=1934409>

Question 11

A statistics teacher wants to know how her students feel about mathematics courses. She decides to administer a survey to a random sample of students taking a mathematics

course. She has several sampling plans to choose from. Name the sampling strategy in each.

- There are four ranks of students taking the class: freshmen, sophomores, juniors, and seniors. Randomly select 15 students from each class rank.
- Randomly select ten math class sections and survey every student in each of those sections.
- Each student has a nine-digit student number. Randomly choose 60 different nine-digit numbers and survey the students that correspond to those numbers.
- Randomly select a number from 1 to 5. Using the class roster, start at that number, then select every fifth student from the list after that.

Answer: <https://biology-forums.com/index.php?topic=1934160>

Question 12

Studying Assume that 75% of the AP* Stat students studied for this test. If 40% of those who study get an A, but only 10% of those who don't study get an A, what is the probability that someone who gets an A actually studied for the test?

Answer: <https://biology-forums.com/index.php?topic=1934178>

Question 13

Subaru costs Data collected from internet ads for 1999 Subarus were used to create a model to estimate the asking price of the car based on the number of miles it had been driven. The model has $r^2 = 0.47$ and equation $= 15,327 - 0.11(\text{Miles})$. The plot of residuals versus the predicted price is shown.

- Do you think you could make accurate estimates of Subaru prices with this model? Explain.
- Interpret the slope of the line.
- One of the cars in the data set had been driven 42,000 miles. How much was the owner asking for it? (Show work.)

Answer: <https://biology-forums.com/index.php?topic=1934147>

Question 14

A sports analyst was interested in finding out how well a football team's winning percentage (stated as a proportion) can be predicted based upon points scored and points allowed. She selects a random sample of 15 football teams. Each team played 10 games. She decided to use the point differential, points scored minus points allowed as the predictor variable. The data are shown in the table below, and regression output is given afterward.

Is there evidence of an association between Point Differential and Winning Percentage? Test an appropriate hypothesis and state your conclusion in the proper context.

Answer: <https://biology-forums.com/index.php?topic=1934277>

Question 15

The boxplots show fuel economy of 2011 model cars for the classes shown.

- Which class offers the car with the best gas mileage, and what is the mileage of that car?
- Which class has the highest median gas mileage, and how much is it?
- Which class of car has the smallest range of fuel economy, and what is it?
- Which class of car has the smallest IQR, and what is it?
- Which class of car generally gets the best mileage? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934064>

Question 16

Current research states that a good diet should contain 20-35 grams of dietary fiber. Research also states that each day should start with a healthy breakfast. The nutritional information for 77 breakfast cereals was reviewed to find the grams of fiber and the number of calories per serving. The scatterplot below shows the relationship between fiber and calories for the cereals.

Do you think there is a clear pattern? Describe the association between fiber and calories.

Answer: <https://biology-forums.com/index.php?topic=1934360>

Question 17

Grades You believe that there is a 20% chance that you will earn an A in your English class, a 10% chance that you will earn an A in your Physics class, and a 5% chance that you will earn an A in both classes.

- Find the probability that you do not get an A in either English or Physics.
- Are "earning an A in English" and "earning an A in Physics" disjoint events? Explain.

c. Are "earning an A in English" and "earning an A in Physics" independent events? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934169>

Question 18

At www.census.gov you can create a "population pyramid" for any country. These pyramids are back-to-back histograms. This pyramid shows Mexico's 2000 female population and the census bureau's projection for 2050. Write a few sentences summarizing the changes that are forecast.

Answer: <https://biology-forums.com/index.php?topic=1934062>

Question 19

As a 4-H project, Billy is raising chickens. He feeds and waters them every day, and collects the eggs every other day, selling them to people in the neighborhood. He has found that each hen's nest will contain from 0 to 2 eggs. Based on past experience he estimates that there will be no eggs in 10% of the nests, one egg in 30% of the nests, and 2 eggs in the other 60%. Conduct a simulation to estimate how many nests Bill will have to visit to collect a dozen eggs.

State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934385>

Question 20

Cloning A random sample of 800 adults was asked the following question: "Do you think current laws concerning the use of cloning for medical research are too strict, too lenient, or about right?" The pollsters also classified the respondents with respect to highest education level attained: high school, 2-year college degree, 4-year degree, or advanced degree. We wish to know if attitudes on cloning are related to education level. (All the conditions are satisfied - don't worry about checking them.)

- Write appropriate hypotheses.
- Suppose the expected counts had not been given. Show how to calculate the expected count in the first cell (106.01).
- How many degrees of freedom?
- State your complete conclusion in context.

Answer: <https://biology-forums.com/index.php?topic=1934280>

Question 21

A college admissions counselor was interested in finding out how well high school grade point averages (HS GPA) predict first-year college GPAs (FY GPA). A random sample of data from first-year students was reviewed to obtain high school and first-year college GPAs. The data are shown below:

Create and interpret a 95% confidence interval for the slope of the regression line.

Answer: <https://biology-forums.com/index.php?topic=1934518>

Question 22

In order to see which variety of apple tree produces more fruit, a farmer sets up an experiment. He has three plots of land with different soil and natural water availability. Each plot has room for eight trees.

The farmer randomly selects four locations in each plot for the first variety of tree and the other four get the second variety. This experiment is

- completely randomized with one factor: the variety of tree
 - randomized block, blocked by plot of land
 - completely randomized with two factors
 - randomized block, blocked by variety of tree
 - completely randomized with one factor: the plot of land
- It was discovered that a larger proportion of children who slept with nightlights later developed nearsightedness, compared to children who did not sleep with nightlights.

The headlines read, Leaving a light on for you children causes nearsightedness Later it was pointed out that nearsighted people have more trouble seeing in the dark and are more likely to leave lights on at night for their kids. And those same nearsighted parents are likely to have nearsighted kids.

This is an example of

- a randomized block design.
 - a placebo.
 - a lurking variable.
 - bias.
 - a control group.
- A Columbia University study linked soda consumption to behavior problems in children. Researchers examined data from a previous study that followed 2929 mother-child pairs.

One survey asked about behaviors of the child and also about soda consumption. They found that the more soda the kids drank, the more behavior problems they had. What aspect of a well-designed experiment is absent from this study?

- a control group

- B) randomization
- C) blinding
- D) a placebo

E) all of these

Q. 4 In an experiment the primary purpose of blocking is to

- A) reduce the within-treatment variation.
- B) reduce the between-treatment variation.
- C) eliminate the need for random assignment of treatments.
- D) eliminate confounding variables.

E) reduce bias.

Q. 5 A company has tried to improve the effectiveness of its dishwashing detergent and wants to see if it works better than the original formula. They use 6 identical new dishwashers and load them identically with dirty dishes.

Three packs of each of the two types of detergent are used, and they are randomly assigned to one of the six dishwashers. After the load is run, they rate each load for overall cleanliness. Which of the following is true?

- A) Blinding is impossible in this experiment because they must be able to see the dishes.
- B) The explanatory variable is the different dishwashers.
- C) Because each brand is used in three dishwashers, replication is used properly.
- D) A control group with no detergent at all is needed.

E) The response variable is the type of detergent.

Q. 6 Does Procellera Antimicrobial Wound Dressing help injuries heal faster? Researchers checked records of 38 patients who had been treated for acute or chronic wounds between 2010 and 2012.

They found that those who had been treated with Procellera healed almost twice as fast. This is a

- A) matched experiment
- B) prospective study
- C) retrospective study
- D) survey

E) randomized experiment

Q. 7 A school district administrator sent a survey to all teachers in the district. Only 30 of the teachers responded to the survey. Which of the following is true?

- I. The people that did not respond are likely to be similar to those that did so he should use them as the sample.
- II. This survey design suffered from non-response bias.
- III. Because he sent the survey to everyone, this is a census and the results can be applied to the whole population.

- A) II only
- B) I, II, and III
- C) I only
- D) I and II only
- E) II and III only

Answer: <https://biology-forums.com/index.php?topic=1698025>

Question 23

One common method of evaluating the performance of a mutual fund is to compare its returns to those of a recognized benchmark such as an index of the returns on all securities of the type that the fund accumulates. The Janus Worldwide Fund considers its benchmark to be the MSCI World IndexSM. The table below depicts the annual returns (percent) for a recent ten-year period. Is this fund a good investment? That is, does this fund significantly outperform its benchmark?

Source:

[https://www3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20\(Janus%20Worldwide%20Fund-Class%20A\)_exp%2004-15-13.pdf](https://www3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20(Janus%20Worldwide%20Fund-Class%20A)_exp%2004-15-13.pdf)

Carry out the appropriate test and state your conclusion in context.

Answer: <https://biology-forums.com/index.php?topic=1934254>

Question 24

Maple trees A forester would like to know how big a maple tree might be at age 50 years. She gathers data from some trees that have been cut down, and plots the diameters (in inches) of the trees against their ages (in years). First she makes a linear model. The scatterplot and residuals plot are shown.

- a. Describe the association shown in the scatterplot.
- b. Do you think the linear model is appropriate? Explain.
- c. If she uses this model to try to predict the diameter of a 50-year old maple tree, would you expect that estimate to be fairly accurate, too low, or too high? Explain.

Now she re-expresses the data, using the logarithm of age to try to predict the diameter of the tree. Here are the regression analysis and the residuals plot.

- d. Explain why you think this is a better model.
- e. Using this model, predict the diameter of a maple tree at age 50 years.

Answer: <https://biology-forums.com/index.php?topic=1934150>

Question 25

A company's manufacturing process uses 500 gallons of water at a time. A "scrubbing" machine then removes most of a chemical pollutant before pumping the water into a nearby lake. Legally the treated water should contain no more than 80 parts per million of the chemical, but the machine isn't perfect and it is costly to operate. Since there's a fine if the discharged water exceeds the legal maximum, the company sets the machine to attain an average of 75 ppm for the batches of water treated. They believe the machine's output can be described by a Normal model with standard deviation 4.2 ppm. (SHOW WORK.)

- What percent of the batches of water discharged exceed the 80ppm standard?
- The company's lawyers insist that they have not more than 2% of the water over the limit. To what mean value should the company set the scrubbing machine? Assume the standard deviation does not change.
- Because achieving a mean that low would raise the costs too much, they decide to leave the mean set at 75 ppm and try to reduce the standard deviation to achieve the "only 2% over" goal. Find the new standard deviation needed.
- Explain what achieving a smaller standard deviation means in this context.

Answer: <https://biology-forums.com/index.php?topic=1934305>

Question 26

Health care Organizations like Gallup often track public opinion on many issues by asking the same question at different times. In October of 2013, Gallup reported that 52% of U.S. adults disapprove of the Affordable Care Act (known as Obamacare), which is up from 45% a year earlier. Assume these were both based on random samples of 450 people. Use a significance test to determine if this is evidence of a real change in public opinion.

Answer: <https://biology-forums.com/index.php?topic=1934230>

Question 27

Still strange dice A game is played with 2 strange dice.

- The six faces of Die A show a 1 and five 3's.
- Die B has four 2's and two 6's.

Suppose you use the two dice in a competition against another player. You will roll one of the dice and your opponent will roll the other one. The winner is the person who rolls the higher number. You get first choice of dice and want to win. Would you pick Die A or Die B? Explain why.

Answer: <https://biology-forums.com/index.php?topic=1934446>

Question 28

SAT prep Surveys indicate that 5% of the students who took the SATs had enrolled in an SAT prep course. 30% of the SAT prep students were admitted to their first choice college, as were 20% of the other students. You overhear a classmate say he got into the college he wanted. What is the probability he didn't take an SAT prep course?

Answer: <https://biology-forums.com/index.php?topic=1934442>

Question 29

Shoot You and a friend are working on shooting free throws at basketball practice. Your friend has a season average of making 80% of his shots.

- If the coach asks your friend to shoot 70 times, how many shots do you expect him to make, on average?
- What is the standard deviation of the number of shots made out of 70?
- Your friend makes 60 out of 70 shots and is ready to tell the coach that he is improving. The graph below shows a simulation of this distribution. Using both your answers to (a) and (b) and this graph, explain whether or not the coach should have confidence in his improvement.

Answer: <https://biology-forums.com/index.php?topic=1934460>

Question 30

Most people are definitely dominant on one side of their body - either right or left. For some sports being able to use both sides is an advantage, such as batting in baseball or softball. In order to determine if there is a difference in strength between the dominant and non-dominant sides, a few switch-hitting members of some school baseball and softball teams were asked to hit from both sides of the plate during batting practice. The longest hit (in feet) from each side was recorded for each player. The data are shown in the table below. Does this sample indicate that there is a difference in the distance a ball is hit by batters who are switch-hitters?

Create and interpret a 95% confidence interval.

Answer: <https://biology-forums.com/index.php?topic=1934251>

Question 31

Dice rolls Two players compete against each other by rolling dice - not the traditional dice, though. One face of Alphonso's die has an 8 and the other five faces are all 2's. Bettina's die has four 3's and two 1's on the six faces.

- They each roll their die, and the player with the highest score wins. Which player has the advantage? Explain.
- If Alphonso wins, Bettina pays him \$10. How much should he pay her if she wins in order to make the game fair?

- c. They decide to change the rules. They'll each roll, and the winner will collect the number of dollars shown on his or her die. For example, If Alphonso rolls a 2 and Bettina rolls a 3, he'll pay her \$3. Create a probability model for the amount Alphonso wins.
- d. Find the expected value and standard deviation of Alphonso's winnings at this game.
- e. If they play this new game repeatedly which player has the advantage? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934182>

Question 32

A school board study found a moderately strong negative association between the number of hours high school seniors worked at part-time jobs after school hours and the students' grade point averages.

- a. Explain in this context what "negative association" means.
- b. Hoping to improve student performance, the school board passed a resolution urging parents to limit the number of hours students be allowed to work. Do you agree or disagree with the school board's reasoning? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934076>

Question 33

All 423 Wisconsin public schools were all given a rating by the Wisconsin Department of Public Instruction based on several variables. The mean rating reported was 71.5 and the standard deviation was 4.87. To do a follow-up study a random sample of 40 schools was selected. In this sample, the mean rating was 70.9. One of the researchers is alarmed, thinking the report may have been mistaken. Do you think this sample result is unusually low? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934468>

Question 34

We wish to compare the average ages of the math and science teachers at your high school. Which is the best way to collect the data?

- A) experiment
B) census
C) sample survey
D) simulation
E) observational study
- Q. 2/ Among a dozen eggs, three are rotten. A cookie recipe calls for two eggs; they'll be selected randomly from that dozen. Which plan could be used to simulate the number of rotten eggs that might be chosen?

- I. Let 0, 1, and 2 represent the rotten eggs, and 3, 4, , 11 the good eggs. Generate two random numbers 0-11, ignoring repeats.
II. Randomly generate a 0, 1, or 2 to represent the number of rotten eggs you get.
III. Since 25 of the eggs are rotten, let 0 = rotten and 1, 2, 3 = good. Generate two random numbers 0-3 and see how many 0's you get.

A) I, II, and III B) I only C) I and III D) III only E) II only

Q. 3/ Military funding A college group is investigating student opinions about funding of the military. They phone a random sample of students at the college, asking each person one of these questions (randomly chosen):

- A: Do you think that funding of the military should be increased so that the United States can better protect its citizens?
B: Do you think that funding of the military should be increased?

Which question do you expect will elicit greater support for increased military funding? Explain. What kind of bias is this?

Q. 4/ College students' spending A consumer group wants to see if a new education program will improve the spending habits of college students.

Students in an economics class are randomly assigned to three different courses on spending habits.

- a. What are the experimental units?
b. How many factors are there?
c. How many treatments are there?
d. What is the response variable?
- Q. 5/ Video games A headline in a local newspaper announced Video game playing can lead to better spatial reasoning abilities.

The article reported that a study found statistically significant differences between teens who play video games and teens who do not, with teens who play video games testing better in spatial reasoning. Do you think the headline was appropriate? Explain.

Q. 6/ A researcher wants to compare the effect of a new type of shampoo on hair condition. The researcher believes that men and women may react to the shampoo differently.

Additionally, the researcher believes that the shampoo will react differently on hair that is dyed. The subjects are split into four groups: men who dye their hair; men who do not dye their hair; women who dye their hair; women who do not dye their hair. Subjects in each group are randomly assigned to the new shampoo and the old shampoo. This experiment

- A) has three factors (shampoo type, gender, whether hair is dyed).
B) has two factors (shampoo type and whether hair is dyed) blocked by gender
C) is completely randomized.

D) has one factor (shampoo type), blocked by gender and whether hair is dyed.

E) has two factors (gender and whether hair is dyed) blocked by shampoo type.

Answer: <https://biology-forums.com/index.php?topic=1698029>

Question 35

Height of adults According to the National Health Survey, heights of adults may have a Normal model with mean heights of 69.1" for men and 64.0" for women. The respective standard deviations are 2.8" and 2.5."

a. Based on this information,

i. How much taller are men than women, on average?

ii. What is the standard deviation for the difference in men's and women's heights?

b. Assume that women date men without considering the height of the man (i.e., that the heights of the couple are independent). What is the probability that a woman dates a man shorter than she is?

Answer: <https://biology-forums.com/index.php?topic=1934170>

Question 36

Pew Research reports that 63% of the U.S. adult cell phone owners use their phone to go online. A company wants to target 16- to 24-year olds for advertising and they wonder if that age group has a similar pattern of phone use.

The company wants to estimate the true percentage of 16- to 24-year old cell phone owners who use their phone to go online to within $\pm 7.5\%$, with 95% confidence. How many cell phone owners in this age group should they sample?

Answer: <https://biology-forums.com/index.php?topic=1934482>

Question 37

At an antique boat show, 90% of the boats are made of a natural, polished wood. 75% of the boats have some chrome accents on the boat on at least one visible feature. And 60% have both features.

What is the probability that if a boat has chrome accents it is also made of natural wood?

Answer: <https://biology-forums.com/index.php?topic=1934406>

Question 38

A fast food restaurant just leased a new freezer and food fryer for three years. The service contract for the freezer offers unlimited repairs for a fee of \$125 a year plus a \$35 service charge for each repair needed. The restaurant's research suggested that during a given year 80% of these freezers need no repairs, 11% needed to be serviced once, 5% twice, 4% three times, and none required more than three repairs.

Find the expected number of repairs this kind of freezer is expected to need each year. Show your work.

Answer: <https://biology-forums.com/index.php?topic=1934410>

Question 39

One thousand students from a local university were sampled to gather information such as gender, high school GPA, college GPA, and total SAT scores. The results were used to create histograms displaying high school grade point averages (GPA's) for both males and females. Compare the grade distribution of males and females.

Answer: <https://biology-forums.com/index.php?topic=1934322>

Question 40

Earning power A college's job placement office collected data about students' GPAs and the salaries they earned in their first jobs after graduation. The mean GPA was 2.9 with a standard deviation of 0.4. Starting salaries had a mean of \$47,200 with a SD of \$8500. The correlation between the two variables was $r = 0.72$. The association appeared to be linear in the scatterplot. (Show work.)

a. Write an equation of the model that can predict salary based on GPA.

b. Do you think these predictions will be reliable? Explain.

c. Your brother just graduated from that college with a GPA of 3.30. He tells you that based on this model the residual for his pay is -\$1880. What salary is he earning?

Answer: <https://biology-forums.com/index.php?topic=1934090>

Question 41

Storks Data show that there is a positive association between the population of 17 European countries and the number of stork pairs in those countries.

a. Briefly explain what "positive association" means in this context.

b. Wildlife advocates want the stork population to grow, and jokingly suggest that citizens should be encourage to have children. As a statistician, what do you think of this plan? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1934135>

Question 42

Does regular exercise decrease the risk of cancer? A researcher finds 200 women over 50 who exercise regularly, pairs each with a woman who has a similar medical history but does not exercise, then follows subjects for 10 years to see which group

develops more cancer. This is a

- A) survey
- B) prospective study
- C) randomized experiment
- D) retrospective study
- E) matched experiment

I. An attempt to take a census will always result in less bias than sampling.

II. Sampling error is usually reduced when the sample size is larger.

III. Sampling error is the result of random variations and is always present.

A) II and III B) I only C) I, II, and III D) II only E) III only

A factory has 20 assembly lines producing a popular toy. To inspect a representative sample of 100 toys, quality control staff randomly selected 5 toys from each line's output. Was this a simple random sample?

A) Yes, because each toy produced had an equal chance to be selected.

B) Yes, because a stratified sample is a type of simple random sample.

C) Yes, because the toys were selected at random.

D) No, because not all combinations of 100 toys could have been chosen.

E) No, because toys do not come off the assembly line at random.

If we wish to compare the average PSAT scores of boys and girls taking AP Statistics at a high school, which would be the best way to gather these data?

A) observational study

B) SRS

C) experiment

D) stratified sample

E) census

Moods A headline in the New York Times announced Research shows running can alter one's moods.

The article reported that researchers gave a Personality Assessment Test to 231 males who run at least 20 miles a week, and found statistically significant personality differences between the runners and the male population as a whole. Do you think the headline was appropriate?

Explain.

Cloning A polling organization is investigating public opinion about cloning. They phone a random sample of 1200 adults, asking each person one of these questions (randomly chosen):

A: Do you favor allowing doctors to use cloned cells in attempts to find cures for such terrible diseases as Alzheimer's, diabetes, and Parkinson's?

B: Should research scientists be allowed to use cloned human embryos in their experiments?

Which question do you expect will elicit greater support for cloning? Explain. What kind of bias is this?

Answer: <https://biology-forums.com/index.php?topic=1698027>

Question 43

Dimes minted in the United States average 2.286 g with a standard deviation of 0.06 g. A couple chemistry students were trying out their teacher's new scale by weighing a bunch of coins. They found a nickel that weighed 5.19 g and a dime that weighed 2.45 g. Which coin was more exceptionally heavy? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934334>

Question 44

One of your classmates is working on a science project for a unit on weather. She tracks the temperature one day, beginning at sunrise and finishing at sunset. Given that you are known for being the stats expert, she asks you about calculating the correlation for her data. What is the best advice you could give her?

Answer: <https://biology-forums.com/index.php?topic=1934082>

Question 45

Studying for exams A philosophy professor has found a correlation of 0.80 between the number of hours students study for his exams and their exam performance. During the time he collected the data, students studied an average of 10 hours with a standard deviation of 2.5 hours, and scored an average of 80 points with a standard deviation of 7.5 points.

a. Create a linear model to estimate the number of points a student will score on the next exam from the number of hours the student studies.

b. If a student studies for 15 hours, what score should the student expect on the next exam? Show your work.

Answer: <https://biology-forums.com/index.php?topic=1934137>

Question 46

There is a proposal to replace the shortest roller coaster above with one that has a length of 1,200 ft. Indicate whether changing that roller coaster's length would make each of these summary statistics increase, decrease, or stay about the same.

- mean
- median
- range
- IQR
- standard deviation

Answer: <https://biology-forums.com/index.php?topic=1934059>

Question 47

A survey of local car dealers revealed that 64% of all cars sold last month had CD players, 28% had alarm systems, and 22% had both CD players and alarm systems.

- What is the probability one of these cars selected at random had neither a CD player nor an alarm system?
- What is the probability that a car had a CD player unprotected by an alarm system?
- What is the probability a car with an alarm system had a CD player?
- Are having a CD player and an alarm system disjoint events? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934400>

Question 48

A statistics professor asked her students whether or not they were registered to vote. In a sample of 50 of her students (randomly sampled from her 700 students), 35 said they were registered to vote.

Find a 95% confidence interval for the true proportion of the professor's students who were registered to vote. (Make sure to check any necessary conditions and to state a conclusion in the context of the problem.)

Answer: <https://biology-forums.com/index.php?topic=1934469>

Question 49

The Postmaster of a city's Post Office believes that a Normal model is useful in projecting the number of letters which will be mailed during the day. They use a mean of 20,000 letters and a standard deviation of 250 letters. Draw and clearly label this model.

Answer: <https://biology-forums.com/index.php?topic=1934327>

Question 50

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.

What is the correlation between year and postal rate?

Answer: <https://biology-forums.com/index.php?topic=1934121>

Question 51

Auto insurance The Insurance Institute for Highway Safety publishes ratings for all models of vehicles to compare the relative risk of payouts. 100 is the mean rating for all vehicles. A rating of 122 means the vehicle is 22% worse than average. The table shows the summary statistics for the collision ratings of 27 midsize cars.

- Were any of the ratings outliers? Show how you made your decision.
- A histogram of the data is shown. Is it more appropriate to use the mean and standard deviation, or the median and IQR to describe these data? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934341>

Question 52

Baseball coaches use a radar gun to measure the speed of pitcher's fastball. They also record outcomes such as hits and strikeouts. The scatterplot below shows the relationship between the average speed of a fastball and the average number of strikeouts per nine innings for each pitcher on the Bulldogs, based on the past season.

Do you think the association would be stronger or weaker if we used data from one month of the season?

Answer: <https://biology-forums.com/index.php?topic=1934365>

Question 53

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthy A. Bowman, Journal of the American Dietetic Association, 102(9), pp. 1234-1239):

Do you think that milk consumption by young girls is independent of the nationwide survey year? Use statistics to justify your reasoning.

Answer: <https://biology-forums.com/index.php?topic=1934050>

Question 54

High Score The longer you play a video game, the higher score you can usually achieve. An analysis of a popular game found the following relationship between the hours a player has played a game and their corresponding high score on that game.

- Write the regression equation and define the variables of your equation in context.
- Interpret the slope in context.
- Interpret the y-intercept in context.
- Interpret s in context.
- What is the correlation coefficient? Interpret this value in context.

Answer: <https://biology-forums.com/index.php?topic=1934108>

Question 55

Cheater? A group of curious college students decide to test the integrity of their fellow collegians. In order to see if students will cheat, when given an opportunity, they decide to use chocolate M&M's. They tell each student that a discerning palette will be able to tell the difference in flavor between red and a yellow candy. The blindfolded subjects are given two piles of candy to test. But the experimenter turns his back so that the subject thinks that they have a window of opportunity to take a quick peak. Unbeknownst to the subjects, there is another helper who is hidden and secretly watching to see who cheats. Here is their data.

- What is the probability that a subject cheated?
- If a subject was a male, what are the chances that they cheated?
- Using your answers to (a) and (b), does it appear that cheating and gender are independent?
- A statistics student in the group decides she wants to run a Chi-square test for independence. Why would this not be an advisable choice?
- An argument begins. The girls are suggesting that the guys cheated more than girls; and that this difference is larger than can be explained by chance variation. Of course, the guys insist that with a small sample size like this, anything could happen. Fortunately, a randomization machine is discovered. The 18 observations are randomly placed into the 4 categories randomly. This procedure is repeated 1000 times and the number of male cheaters is counted each time. A graph is below. What does this graph tell you about the claims of the two groups?

Answer: <https://biology-forums.com/index.php?topic=1934303>

Question 56

Human body temperatures taken through the ear are typically 0.5°F higher than body temperatures taken orally. Making this adjustment and using the 1992 Journal of the American Medical Association article that reports average oral body temperature as 98.2°F , we will assume that a Normal model with an average of 98.7°F and a standard deviation of 0.7°F is appropriate for body temperatures taken through the ear.

- An ear temperature of 97°F may indicate hypothermia (low body temperature). What percent of people have ear temperatures that may indicate hypothermia?
- Find the interquartile range for ear temperatures.
- A new thermometer for the ear reports that it is more accurate than the ear thermometers currently on the market. If the average ear temperature reading remains the same and the company reports an IQR of 0.5°F , find the standard deviation for this new ear thermometer.

Answer: <https://biology-forums.com/index.php?topic=1934324>

Question 57

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation - bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

Which of the W's are unknown for these data?

Answer: <https://biology-forums.com/index.php?topic=1934052>

Question 58

In June 2003 Consumer Reports published an article on some sport-utility vehicles they had tested recently. They reported some basic information about each of the vehicles and the results of some tests conducted by their staff. Among other things, the article told the brand of each vehicle, its price, and whether it had a standard or automatic transmission. They reported the vehicle's fuel economy, its acceleration (number of seconds to go from zero to 60 mph), and its braking distance to stop from 60 mph. The article also rated each vehicle's reliability as much better than average, better

than average, average, worse, or much worse than average.

List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.

Answer: <https://biology-forums.com/index.php?topic=1934045>

Question 59

Although most of us buy milk by the quart or gallon, farmers measure daily production in pounds. Guernsey cows average 39 pounds of milk a day with a standard deviation of 8 pounds. For Jerseys the mean daily production is 43 pounds with a standard deviation of 5 pounds. When being shown at a state fair a champion Guernsey and a champion Jersey each gave 54 pounds of milk. Which cow's milk production was more remarkable?

Explain.

Answer: <https://biology-forums.com/index.php?topic=1934332>

Question 60

On January 1 of every year, many people watch the Rose Parade on television. The week before the parade is very busy for float builders and decorators. Roses, carnations, and other flowers are purchased from around the world to decorate the floats. Based on past experience, one float decorator found that 10% of the bundles of roses delivered will not open in time for the parade, 20% of the bundles of roses delivered will have bugs on them and be unusable, 60% of the bundles of roses will turn out to be beautiful, and the rest of the bundles of roses delivered will bloom too early and start to discolor before January 1. Conduct a simulation to estimate how many roses the float decorator will need to purchase to have 15 good bundles of roses to place on the float.

Show three trials by clearly labeling the random number table given below. Specify the outcome for each trial.

37542 04805 64894 74296 24805 24037 20636 10402 00822

08422 68953 19645 09303 23209 02560 15953 34764 35080

99019 02529 09376 70715 38311 31165 88676 74397 04436

12807 99970 80157 36147 64032 36653 98951 16877 12171

Answer: <https://biology-forums.com/index.php?topic=1934383>

Question 61

On January 1 of every year, many people watch the Rose Parade on television. The week before the parade is very busy for float builders and decorators. Roses, carnations, and other flowers are purchased from around the world to decorate the floats. Based on past experience, one float decorator found that 10% of the bundles of roses delivered will not open in time for the parade, 20% of the bundles of roses delivered will have bugs on them and be unusable, 60% of the bundles of roses will turn out to be beautiful, and the rest of the bundles of roses delivered will bloom too early and start to discolor before January 1. Conduct a simulation to estimate how many roses the float decorator will need to purchase to have 15 good bundles of roses to place on the float.

Describe how you will use a random number table to conduct this simulation.

Answer: <https://biology-forums.com/index.php?topic=1934151>

Question 62

Cereal A box of Raspberry Crunch cereal contains a mean of 13 ounces with a standard deviation of 0.5 ounce. The distribution of the contents of cereal boxes is approximately Normal. What is the probability that a case of 12 cereal boxes contains a total of more than 160 ounces?

Answer: <https://biology-forums.com/index.php?topic=1934185>

Question 63

Environmental researchers have collected rain acidity data for several decades. They want to see if there is any evidence that attempts to reduce industrial pollution have produced a trend toward less acidic rainfall.

They should display their data in a(n)

A) bar graph

B) contingency table

C) histogram

D) timeplot

E) boxplot

Q. 2 Suppose that a Normal model describes the acidity (pH) of rainwater, and that water tested after last week's storm had a z-score of 1.8. This means that the acidity of that rain

A) had pH 1.8 times that of average rainwater.

B) had pH 1.8 standard deviations higher than average rainwater.

C) had pH of 1.8.

D) varied with a st. dev. of 1.8.

E) had pH 1.8 higher than avg. rainfall.

Q. 3 We might choose to display data with a stemplot rather than a boxplot because a stemplot

I. reveals the shape of the distribution.

II. is better for large data sets.

III. displays the actual data.

A) II only B) I, II, and III C) I and III D) I only E) III only

Q. 4 The mean number of hours worked for the 30 males was 6, and for the 20 females was 9. The overall mean number of hours worked

A) is none of these.

B) is 7.2

C) is 7.5

D) is 6.5

E) cannot be determined.

Q. 5 Which of those variables is most likely to follow a Normal model

A) eye color

B) number of cigarettes smoked daily

C) head circumference

D) number of TV sets at home

E) hours of homework last week

Q. 6 Which of those variables is most likely to be bimodal?

A) number of TV sets at home

B) hours of homework last week

C) number of cigarettes smoked daily

D) eye color

E) head circumference

Q. 7 We collect these data from 50 male students. Which variable is categorical?

A) head circumference

B) number of TV sets at home

C) eye color

D) number of cigarettes smoked daily

E) hours of homework last week

Answer: <https://biology-forums.com/index.php?topic=1698343>

Question 64

Owners of a minor league baseball team believe that a Normal model is useful in projecting the number of fans who will attend home games. They use a mean of 8500 fans and a standard deviation of 1500 fans. Draw and clearly label this model.

Answer: <https://biology-forums.com/index.php?topic=1934331>

Question 65

Height and weight Suppose that both height and weight of adult men can be described with Normal models, and that the correlation between these variables is 0.65. If a man's height places him at the 60th percentile, at what percentile would you expect his weight to be?

Answer: <https://biology-forums.com/index.php?topic=1934138>

Question 66

Internet Question 9 described a Pew Research poll that found 15% of American adults do not use the internet or e-mail with a margin of error of 2.3% and 95% confidence. What was the sample size?

Answer: <https://biology-forums.com/index.php?topic=1934229>

Question 67

A large manufacturer of batteries knows that, historically, 10% of its batteries come off the production line defective, and the remaining 90% of batteries come off the production line in working condition. Conduct a simulation to estimate how many batteries the company needs to pull off the production line in order to be sure of ending up with 10 working batteries.

State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934382>

Question 68

A researcher wants to compare the performance of three types of pain relievers in volunteers suffering from arthritis. Because people of different ages may suffer arthritis of varying degrees of severity,

the subjects are split into two groups: younger than 60 and older than 60. Subjects in each group are randomly assigned to take one of the medications. Twenty minutes later they rate their levels of pain. This experiment

A) has one factor (med.) blocked by age.

B) has one factor (age) blocked by medication type.

C) is completely randomized.

D) has two factors, medication and age.

E) uses matched pairs.

Q. 2/ In order to measure the dispersion of a set of data relative to its level of magnitude, we use:

A) z-scores. B) Chebyshev's theorem.

C) the coefficient of variation. D) the empirical rule.

Q. 3/ To help consumers assess the risks they are taking, the Food and Drug Administration (FDA) publishes the amount of nicotine found in all commercial brands of cigarettes.

A new cigarette has recently been marketed. The FDA tests on this cigarette gave a mean nicotine content of 26.1 milligrams and standard deviation of 2.9 milligrams for a sample of $n = 9$ cigarettes. The FDA claims that the mean nicotine content exceeds 28.9 milligrams for this brand of cigarette, and their stated reliability is 90. Do you agree?

A) No, since the value 28.9 does fall in the 90 confidence interval.

B) No, since the value 28.9 does not fall in the 90 confidence interval.

C) Yes, since the value 28.9 does fall in the 90 confidence interval.

D) Yes, since the value 28.9 does not fall in the 90 confidence interval.

Q. 4/ Nominal data is also called categorical data.

Indicate whether the statement is true or false.

Q. 5/ The mathematical expectation is a kind of average.

Indicate whether the statement is true or false.

Q. 6/ Which of the following would be a desirable property of a frequency distribution?

A) contains open end classes B) contains more than 15 classes

C) contains exactly 4 classes D) contains equal class intervals

Q. 7/ Assume that $P(A) = 0.7$ and $P(B) = 0.2$. If A and B are independent, find $P(A \text{ and } B)$.

A) 0.90 B) 0.14 C) 0.76 D) 1.00

Q. 8/ The probability that a house in an urban area will develop a leak is 5. If 28 houses are randomly selected, what is the probability that none of the houses will develop a leak?

A) 0.000 B) 0.050 C) 0.238 D) 0.002

Answer: <https://biology-forums.com/index.php?topic=1698175>

Question 69

Exercise A random sample of 150 men found that 88 of the men exercise regularly, while a random sample of 200 women found that 130 of the women exercise regularly.

a. Based on the results, construct and interpret a 95% confidence interval for the difference in the proportions of women and men who exercise regularly.

b. A friend says that she believes that a higher proportion of women than men exercise regularly. Does your confidence interval support this conclusion? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934186>

Question 70

Herpetologists (snake specialists) found that a certain species of reticulated python has an average length of 20.5 feet with a standard deviation of 2.3 feet. The scientists collect a random sample of 30 adult pythons and measure their lengths. In their sample the mean length was 19.5 feet long. One of the herpetologists fears that pollution might be affecting the natural growth of the pythons. Do you think this sample result is unusually small? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934464>

Question 71

Breaking strength A company manufactures polypropylene rope in six different sizes. To assess the strength of the ropes they test two samples of each size to see how much force (in kilograms) the ropes will hold without breaking. The table shows the results of the tests. We want to create a model for predicting the breaking strength from the diameter of the rope.

a. Find a model that uses re-expressed data to straighten the scatterplot.

b. The company is thinking of introducing a new 25mm rope. How strong should it be? (Write a sentence in context based on one of your models.)

Answer: <https://biology-forums.com/index.php?topic=1934124>

Question 72

An article in a local newspaper reported that dogs kept as pets tend to be overweight. Veterinarians say that diet and exercise will help these chubby dogs get in shape. The veterinarians propose two different diets (Diet A and Diet B) and two different exercise programs (Plan 1 and Plan 2). Diet A: owners control the portions of dog food and dog treats; Diet B: a mixture of fresh vegetables with the dog food and substitute regular dog treats with baby carrots. three 30-minute walks a week; Plan 2: 20-minute walks daily. Sixty dog owners volunteer to take part in an experiment to help their

chubby dogs lose weight.

Identify the following:

- the subjects:
- the factor(s) and the number of level(s) for each:
- the number of treatments:
- whether or not the experiment is blind (or double-blind):
- the response variable:

Answer: <https://biology-forums.com/index.php?topic=1934163>

Question 73

A young boy is fishing off the end of a dock. He estimates that for one out of every 15 times he casts his line, he gets at least a nibble from a curious fish. He is going to cast his line 50 times before he switches to toad hunting.

What is the probability that he will cast his line without success 20 times before finally succeeding the 21st time?

Answer: <https://biology-forums.com/index.php?topic=1934429>

Question 74

Twenty dogs and 20 cats were subjects in an experiment to test the effectiveness of a new flea control chemical.

Ten of the dogs were randomly assigned to an experimental group that wore a collar containing the chemical, while the others wore a similar collar without the chemical. The same was done with the cats. After 30 days veterinarians were asked to inspect the animals for fleas and evidence of flea bites. This experiment is

- randomized block, blocked by species
 - completely randomized with one factor: the type of collar
 - completely randomized with two factors
 - completely randomized with one factor: the species of animal
 - randomized block, blocked by type of collar
- Q. 2 An appliance store sells both new and used appliances. Fifty percent of the stock is used. Fifty-two percent is used or defective. If 9 of the store's stock is defective, what percentage is both used and defective?

A) 7 B) 11 C) 93 D) 0.07

Q. 3 Which of the following is a possible null hypothesis for a two-tailed hypothesis test?

A) $x = 30$ B) $30 < x < 30$ C) $30 > x > 30$ D) $x = 30$

Q. 4 The method of analysis of variance is not applicable for data in which sample sizes are not all equal.

Indicate whether the statement is true or false

Q. 5 To check the effect of cold temperatures on the battery's ability to start a car researchers purchased a battery from Sears and one from NAPA.

They disabled a car so it would not start, put the car in a warm garage, and installed the Sears battery. They tried to start the car repeatedly, keeping track of the total time that elapsed before the battery could no longer turn the engine over. Then they moved the car outdoors where the temperature was below zero. After the car had chilled there for several hours the researchers installed the NAPA battery and repeated the test. Is this a good experimental design?

- No, because they should have tested other brands of batteries, too.
 - Yes
 - No, because temperature is confounded by brand.
 - No, because the car and the batteries were not chosen at random.
 - No, because they should have tested more temperatures.
- Q. 6 If a distribution is known to be binomial, the most convenient formula that can be used to calculate the mean is $\mu = np$.

Indicate whether the statement is true or false

Q. 7 In a recent survey, 82 of the community favored building more parks in their neighborhood. You randomly select 19 citizens and ask each if he or she thinks the community needs more parks.

Decide whether you can use the normal distribution to approximate the binomial distribution. If so, find the mean and standard deviation. If not, explain why.

Answer: <https://biology-forums.com/index.php?topic=1698147>

Question 75

If we are using the normal approximation to determine the probability of at most 28 successes in a binomial distribution ($P(x \leq 28)$), the normal distribution probability that is used to make the estimate is

A) $P(x > 27.5)$ B) $P(x < 28)$ C) $P(x < 28.5)$ D) $P(x < 28)$.
Q. 2. A quiz consists of 10 true or false questions. To pass the quiz a student must answer at least eight questions correctly. If the student guesses on each question, what is the probability that the student will pass the quiz?

A) 0.8 B) 0.08 C) 0.055 D) 0.20
Q. 3. Assume that $P(E) = 0.15$ and $P(F) = 0.48$. If E and F are independent, find $P(E \text{ and } F)$.

A) 0.630 B) 0.558 C) 0.072 D) 0.15
Q. 4. A study is designed to estimate the average family size per household in a particular state. The state is divided into regions and a random sample of regions is selected. For the regions selected, each household is contacted.

What type of sample will this be?

A) stratified random sample B) systematic sample

C) simple random sample D) cluster sample
Q. 5. Cloning A polling organization is investigating public opinion about cloning.

They phone a random sample of 1200 adults, asking each person one of these questions (randomly chosen):

A: Do you favor allowing doctors to use cloned cells in attempts to find cures for such terrible diseases as Alzheimer's, diabetes, and Parkinson's?

B: Should research scientists be allowed to use cloned human embryos in their experiments?

Which question do you expect will elicit greater support for cloning? Explain. What kind of bias is this?

Q. 6. Determine the sample size required to estimate the mean score on a standardized test within 5 points of the true mean with 98% confidence. Assume that $s = 15$ based on earlier studies.

A) 1 B) 49 C) 150 D) 7
Q. 7. Which of the following is always true for a normal distribution?

A) $P(x > 8) = P(x < 9)$ B) $P(2 < x < 8) = P(2 < x < 8)$

C) $P(x < 5) = P(x > 5)$ D) $P(x < 8) = P(x > 8.5)$
Q. 8. A brewery has a beer dispensing machine that dispenses beer into the company's 12 ounce bottles. The distribution for the amount of beer dispensed by the machine follows a normal distribution with a standard deviation of 0.05 ounce.

The company can control the mean amount of beer dispensed by the machine. What value of the mean should the company use if it wants to guarantee that 98.5% of the bottles contain at least 12 ounces (the amount on the label)? Round to the nearest thousandth.

A) 12.122 oz B) 12.109 oz C) 12.001 oz D) 12.000 oz

Answer: <https://biology-forums.com/index.php?topic=1698171>

Question 76

A group of people are concerned that the coach of a local high school men's and women's basketball teams alters the amount of air in the basketball to gain an unfair advantage over opponents during home games. The idea is that the basketballs are pumped up with one pound per square inch less air than required, and his teams practiced with these altered balls all week prior to home basketball games. Since these under-pumped basketballs would react differently to being shot at a basket, the team that practiced with these balls would have an unfair advantage when it came to shooting free throws.

Describe how to use a retrospective study to determine if the home teams have an unfair advantage when shooting free-throws.

Answer: <https://biology-forums.com/index.php?topic=1934165>

Question 77

Math and Verbal Suppose the correlation between SAT Verbal scores and Math scores is 0.57 and that these scores are normally distributed. If a student's Verbal score places her at the 90th percentile, at what percentile would you predict her Math score to be? (Show your work.)

Answer: <https://biology-forums.com/index.php?topic=1934125>

Question 78

Jacob has a bag of his favorite marbles. It has 3 red marbles, 4 blue and 10 of his most favorite color, neon orange.

What is the probability that if he removes 2 marbles without looking, that he will get two orange marbles?

Answer: <https://biology-forums.com/index.php?topic=1934403>

Question 79

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthly A. Bowman, Journal of the American Dietetic Association, 102(9), pp. 1234-1239):

Find the following:

- What percent of the young girls reported that they drink milk?
- What percent of the young girls were in the 1989-1991 survey?
- What percent of the young girls who reported that they drink milk were in the 1989-1991 survey?
- What percent of the young girls in 1989-1991 reported that they drink milk?

Answer: <https://biology-forums.com/index.php?topic=1934048>

Question 80

On Monday, a class of students took a big test, and the highest score was 92. The next day, a student who had been absent made up the test, scoring 100. Indicate whether adding that student's score to the rest of the data made each of these summary statistics increase, decrease, or stay about the same:

- mean
- median
- range
- IQR
- standard deviation

Answer: <https://biology-forums.com/index.php?topic=1934057>

Question 81

The average composite ACT score for Ohio students who took the test in 2003 was 21.4. Assume that the standard deviation is 1.05. In a random sample of 25 students who took the exam in 2003, what is the probability that the average composite ACT score is 22 or more? (Make sure to identify the sampling distribution you use and check all necessary conditions.)

Answer: <https://biology-forums.com/index.php?topic=1934462>

Question 82

Approval rating The President's job approval rating is always a hot topic. Your local paper conducts a poll of 100 randomly selected adults to determine the President's job approval rating. A CNN/USA Today/Gallup poll conducts a poll of 1010 randomly selected adults. Which poll is more likely to report that the President's approval rating is below 50%, assuming that his actual approval rating is 54%? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934184>

Question 83

For a school project, Max must design a survey. For his survey he plans to randomly select families and gather information about all the children in each of those families. He must have at least 20 children in his sample. The number of children per family in the U.S. is given in the table below. How many families should Max expect to survey to reach at least 20 children? (treat "5 or more" as 5.)

Describe how you will use a random number table to conduct this simulation.

Answer: <https://biology-forums.com/index.php?topic=1934157>

Question 84

Bone Builder Researchers believe that a new drug called Bone Builder will help bones heal after children have broken or fractured a bone. The researchers believe that Bone Builder will work differently on bone breaks than on bone fractures, because of differences in initial bone condition. Bone Builder will be used in conjunction with traditional casts. To test the impact of Bone Builder on bone healing, the researchers recruit 18 children with bone breaks and 30 children with bone fractures. Design an appropriate experiment to determine if Bone Builder will help bones heal.

Answer: <https://biology-forums.com/index.php?topic=1934392>

Question 85

Too much TV? A father is concerned that his teenage son is watching too much television each day, since his son watches an average of 2 hours per day. His son says that his TV habits are no different than those of his friends. Since this father has taken a stats class, he knows that he can actually test to see whether or not his son is watching more TV than his peers. The father collects a random sample of television watching times from boys at his son's high school and gets the following data: 1.9 2.3 2.2 1.9 1.6 2.6 1.4 2.0 2.0 2.2

Is the father right? That is, is there evidence that other boys average less than 2 hours of television per day? Conduct a hypothesis test, making sure to state your conclusions in the context of the problem.

Answer: <https://biology-forums.com/index.php?topic=1934266>

Question 86

During a budget meeting, local school board members decided to review class size information to determine if budgets were correct. Summary statistics are shown in the table.

- Notice that the third quartile and maximum class sizes are the same. Explain how this can be.
- The school district declares that classes with fewer than 20 students are "too small". Would you consider a class of 20 students to be unusually small? Explain.
- The school district sets the office supply budgets of their high schools on the enrollment of students. The district budgets each class \$12 plus \$0.75

per student, so a class with one student receives \$12.75 and the classes with 40 students receive $12 + 0.75(40) = \$42$. What is the median class budget for office supplies? And the IQR?

d. What are the mean and standard deviation of the class office supply budgets?

Answer: <https://biology-forums.com/index.php?topic=1934326>

Question 87

Light bulbs are measured in lumens (light output), watts (energy used), and hours (life). A standard white light bulb has a mean life of 675 hours and a standard deviation of 50 hours. A soft white light bulb has a mean life of 700 hours and a standard deviation of 35 hours. In a test at a local science competition, both light bulbs lasted 750 hours. Which light bulb's life span was better? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934328>

Question 88

Penicillin assimilation Doctors studying how the human body assimilates medication inject a patient with penicillin, and then monitor the concentration of the drug in the patient's blood for several hours. The data are shown in the table.

- Straighten the scatterplot by re-expressing these data and create an appropriate model for predicting the concentration of penicillin.
- Use your model to estimate what the concentration of penicillin will be after 8 hours.

Answer: <https://biology-forums.com/index.php?topic=1934148>

Question 89

At a large business, employees must report to work at 7:30 A.M. The arrival times of employees can be described by a Normal model with mean of 7:22 A.M. and a standard deviation of four minutes.

- What percent of employees are late on a typical work day?
- A psychological study determined that the typical worker needs five minutes to adjust to their surroundings before beginning their duties. What percent of this business' employees arrive early enough to make this adjustment?
- Because late employees are a distraction and cost companies money, all employees need to be on time to work. If the mean arrival time of employees does not change, what standard deviation would the arrival times need to ensure virtually all employees are on time to work?
- Explain what achieving a smaller standard deviation means in the context of this problem.

Answer: <https://biology-forums.com/index.php?topic=1934329>

Question 90

Public opinion A member of the City Council has proposed a resolution opposing construction of a new state prison there. The council members decide they want to assess public opinion before they vote on this resolution. Below are some of the methods that are proposed to sample local residents to determine the level of public support for the resolution. Match each with one of the listed sampling techniques.

- a) Place an announcement in the newspaper asking people to call their council representatives to register their opinions. Council members will tally the calls they receive.
- b) Have each council member survey 50 friends, neighbors, or co-workers.
- c) Have the Board of Elections assign each voter a number, then select 400 of them using a random number table.
- d) Go to a downtown street corner, a grocery store, and a shopping mall; interview 100 typical shoppers at each location.
- e) Randomly pick 50 voters from each election district.
- f) Call every 500th person in the phone book.
- g) Randomly pick several city blocks, then randomly pick 10 residents from each block.
- h) Randomly select several city blocks; interview all the adults living on each block.

Answer: <https://biology-forums.com/index.php?topic=1934394>

Question 91

Before you took this course, you probably heard many stories about Statistics courses. Oftentimes parents of students have had bad experiences with Statistics courses and pass on their anxieties to their children. To test whether actually taking AP* Statistics decreases students' anxieties about statistics, an AP* statistics instructor gave a test to rate student anxiety at the beginning and end of his course. Anxiety levels were measured on a scale of 0-10. Here are the data for 16 randomly chosen students from a class of 180 students:

Do the data indicate that anxiety levels about Statistics decreases after students take AP* Statistics? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934248>

Question 92

Jacob has a bag of his favorite marbles. It has 3 red marbles, 4 blue and 10 of his most favorite color, neon orange.

What are the chances that he as he removes marbles from the bag, he doesn't get an orange marble until his fourth attempt?

Answer: <https://biology-forums.com/index.php?topic=1934405>

Question 93

Could eye color be a warning signal for hearing loss in patients suffering from meningitis? British researcher Helen Cullington recorded the eye color of 130 deaf patients, and noted whether the patient's deafness had developed following treatment for meningitis. Her data are summarized in the table below. Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934516>

Question 94

The owner of a pet store is trying to decide whether to discontinue selling specialty clothes for pets. She suspects that only 4% of the customers buy specialty clothes for their pets and thinks that she might be able to replace the clothes with more interesting and profitable items on the shelves. Before making a final decision she decides to keep track of the total number of customers for a day, and whether they purchase specialty clothes for their pet.

Assuming the pet store owner is correct in thinking that only 4% of her customers purchase specialty clothes for their pets, how many customers should she expect before someone buys a garment for their pet?

Answer: <https://biology-forums.com/index.php?topic=1934416>

Question 95

It is generally believed that nearsightedness affects about 12% of children. A school district gives vision tests to 133 incoming kindergarten children.

a. Describe the sampling distribution model for the sample proportion by naming the model and telling its mean and standard deviation. Justify your answer.

b. Sketch and clearly label the model.

c. What is the probability that in this group over 15% of the children will be found to be nearsighted?

Answer: <https://biology-forums.com/index.php?topic=1934465>

Question 96

For a school project, Max must design a survey. For his survey he plans to randomly select families and gather information about all the children in each of those families. He must have at least 20 children in his sample. The number of children per family in the U.S. is given in the table below. How many families should Max expect to survey to reach at least 20 children? (treat "5 or more" as 5.)

State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934386>

Question 97

In a Latin Square experiment, it is impossible for one factor to have three levels and another to have four levels.

Indicate whether the statement is true or false. Q. 2. Sally and Craig are married. The probability that Sally gets up on time for work is 0.8, and the probability that Craig gets up on time for work is 0.7.

If the probability that Craig gets up on time given that Sally gets up on time is 0.9, find the probability of

I. both getting up on time.

A) 0.72 B) 0.78 C) 0.63 D) 0.94

II. at least one gets up on time.

A) 0.72 B) 0.78 C) 0.63 D) 0.94 Q. 3. If all data points lie on the regression line, then the standard error of estimate is _____.

Fill in the blank(s) with correct word. Q. 4. To determine the mean of a binomial distribution, it is necessary to know the number of successes involved in the problem.

Indicate whether the statement is true or false. Q. 5. The symbol σ^2 denotes the _____.

Fill in the blank(s) with correct word. Q. 6. A _____ exhibits characteristics typical of those possessed by the target population.

Fill in the blank(s) with correct word. Q. 7. Telephone poll The City Council decides to conduct a telephone poll. Pollsters ask a carefully chosen random sample of adults this question:

Do you favor the construction of a new prison to deal with the high level of violent crime in our State? In what way might the proportion of Yes answers fail to accurately reflect true public opinion? Explain briefly. What kind of bias is this?

Answer: <https://biology-forums.com/index.php?topic=1698143>

Question 98

On January 1 of every year, many people watch the Rose Parade on television. The week before the parade is very busy for float builders and decorators. Roses, carnations, and other flowers are purchased from around the world to decorate the floats. Based on past experience, one float decorator found that 10% of the bundles of roses delivered will not open in time for the parade, 20% of the bundles of roses delivered will have bugs on them and be unusable, 60% of the bundles of roses will turn out to be beautiful, and the rest of the bundles of roses delivered will bloom too early and start to discolor before January 1. Conduct a simulation to estimate how many roses the float decorator will need to purchase to have 15 good bundles of roses to place on the float.

State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934384>

Question 99

Hamsters You have ten hamsters. Their weights in grams are 134, 142, 148, 151, 152, 155, 158, 160, 164, 167. Describe a procedure to create a simulated sampling distribution of the sample maximum weight for samples of three hamsters.

Answer: <https://biology-forums.com/index.php?topic=1934228>

Question 100

The January 2005 Gallup Youth Survey telephoned a random sample of 1,028 U.S. teens and asked these teens to name their favorite movie from 2004.

Napoleon Dynamite had the highest percentage with 8 of teens ranking it as their favorite movie. Which is true?

- I. The population of interest is all U.S. teens.
- II. 8 is a statistic and not the actual percentage of all U.S. teens who would rank this movie as their favorite.
- III. This sampling design should provide a reasonably accurate estimate of the actual percentage of all U.S. teens who would rank this movie as their favorite.

A) I only B) I and II C) III only D) II only E) I, II, and III

Q. 2 The mean monthly gasoline bill for one household is greater than 150. If a hypothesis test is performed, how should you interpret a decision that fails to reject the null hypothesis?

- A) There is not sufficient evidence to reject the claim $\mu > 150$.
 - B) There is sufficient evidence to reject the claim $\mu > 150$.
 - C) There is sufficient evidence to support the claim $\mu > 150$.
 - D) There is not sufficient evidence to support the claim $\mu > 150$.
- Q. 3 A local outdoor equipment store is being sold. The buyers are trying to estimate the percentage of items that are outdated. They will randomly sample among its 100,000 items in order to determine the proportion of merchandise that is outdated.

The current owners have never determined their outdated percentage and can not help the buyers. Approximately how large a sample do the buyers need in order to insure that they are 90 confident that the margin of error is within 3?

A) 3007 B) 752 C) 1504 D) 457

Q. 4 Suppose an experiment consists of selecting two smoke detectors from a large shipment. Let the events be:

- A: The first detector is not defective,
- B: The second detector is defective.

Are A and B mutually exclusive events?

A) no B) yes C) cannot be determined

Q. 5 The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60,000 miles and a standard deviation of 1800 miles.

What is the probability a certain tire of this brand will last between 56,220 miles and 56,760 miles?

A) 0.4649 B) 0.4920 C) 0.0180 D) 0.9813

Q. 6 The random variable x represents the number of girls in a family of three children. Assuming that boys and girls are equally likely, find the mean and standard deviation for the random variable x .

- A) mean: 1.50; standard deviation: 0.87 B) mean: 2.25; standard deviation: 0.76
- C) mean: 1.50; standard deviation: 0.76 D) mean: 2.25; standard deviation: 0.87

Q. 7 An _____ is a subset of data selected from a population.

- A) variable B) experimental unit C) statistic D) sample

Answer: <https://biology-forums.com/index.php?topic=1698195>

Question 101

Nickels minted in the United States are supposed to weigh 5.000 grams. Of course there is some variation in that. The actual weights are pretty well

represented by a normal model with a mean of 5.000 g and a standard deviation of about 0.08 g. Draw and clearly label this model.

Answer: <https://biology-forums.com/index.php?topic=1934333>

Question 102

If the teacher in question 1 simply surveyed all of her students, what kind of sampling would that be? Explain why this method is biased. Be sure to name the kind(s) of bias you describe and link it to the variable of interest.

Answer: <https://biology-forums.com/index.php?topic=1934161>

Question 103

For the scenario described below, simply name the procedure that is appropriate to answer the question. For example, 1-proportion z-interval or chi-square goodness of fit test. Do NOT carry out the procedure.

A flower pot manufacturer is testing his clay pots to ensure that the thickness of the sides are made to proper specifications. The sides are designed to be 4 mm thick. In a random sample of 25 pots, it is found that the average thickness is 4.3 mm. Does this provide statistically significant evidence that the manufacturing process is out of alignment?

Answer: <https://biology-forums.com/index.php?topic=1934294>

Question 104

Hospital stays Hospital nurses sampled records of 58 surgery patients. They wondered if length of surgery (in hours) might be related to the length of the hospital stay (in days). To find out, they created the regression analysis shown. (SHOW WORK. Don't bother writing hypotheses, and you may assume the assumptions for inference were all satisfied.)

a. $df =$ _____, $t =$ _____, $P =$ _____ b. State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934521>

Question 105

An article in the Journal of Statistics Education reported the price of diamonds of different sizes in Singapore dollars (SGD). The following table contains a data set that is consistent with this data, adjusted to US dollars in 2004:

Make a scatterplot and describe the association between the size of the diamond (carat) and the cost (in US dollars).

Answer: <https://biology-forums.com/index.php?topic=1934110>

Question 106

A survey of an introductory statistics class in Autumn 2003 asked students whether or not they ate breakfast the morning of the survey. Results are as follows:

- What is the probability that a randomly selected student is female?
- What is the probability that a randomly selected student ate breakfast?
- What is the probability that a randomly selected student is a female who ate breakfast?
- What is the probability that a randomly selected student is female, given that the student ate breakfast?
- What is the probability that a randomly selected student ate breakfast, given that the student is female?
- Does it appear that whether or not a student ate breakfast is independent of the student's sex? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934396>

Question 107

Researchers conduct a study to test a potential side effect of a new allergy medication. A random sample of 160 subjects with allergies was selected for the study. The new "improved" Brand I medication was randomly assigned to 80 subjects, and the current Brand C medication was randomly assigned to the other 80 subjects. 14 of the 80 patients with Brand I reported drowsiness, and 22 of the 80 patients with Brand C reported drowsiness. Compute a 95% confidence interval for the difference in proportions of subjects reporting drowsiness. Show all steps.

Answer: <https://biology-forums.com/index.php?topic=1934487>

Question 108

Put to Work Some students have to work part time jobs to pay for college expenses. A researcher examined the academic performance of students with jobs versus those without. He found a positive association between the number of hours worked and GPA. Explain what "positive association" means in this context.

Answer: <https://biology-forums.com/index.php?topic=1934107>

Question 109

All airline passengers must pass through security screenings, but some are subjected to additional searches as well. Some travelers who carry laptops wonder if that makes them more likely to be searched. Data for 420 passengers aboard a cross-country flight are summarized in the table shown.

Does it appear that being subjected to an additional search is independent of carrying a laptop computer? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934401>

Question 110

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthy A. Bowman, Journal of the American Dietetic Association, 102(9), pp. 1234-1239):

What is the marginal distribution of milk consumption?

Answer: <https://biology-forums.com/index.php?topic=1934049>

Question 111

Student progress The Comprehensive Test of Basic Skills (CTBS) is used by school district to assess student progress. Two of the areas tested are math and reading. A random sample of student results was reviewed to determine if there is an association between math and reading scores on the CTBS. Here are the scatterplot, the residuals plot, a histogram of the residuals, and the regression analysis of the data. Use this information to analyze the association between the math and reading scores on the CTBS.

- Is there an association? Write appropriate hypotheses.
- Are the assumptions for regression satisfied? Explain.
- What do you conclude?
- Create a 95% confidence interval for the true slope.
- Explain in context what your interval means.

Answer: <https://biology-forums.com/index.php?topic=1934522>

Question 112

Baseball coaches use a radar gun to measure the speed of pitcher's fastball. They also record outcomes such as hits and strikeouts. The scatterplot below shows the relationship between the average speed of a fastball and the average number of strikeouts per nine innings for each pitcher on the Bulldogs, based on the past season.

Do you think a model based on these data could accurately predict the average number of strikeouts for a pitcher with an average fastball speed of 70 mph.? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934366>

Question 113

Many school administrators watch enrollment numbers for answers to questions parents ask. Some parents wondered if preferring a particular science course is related to the student's preference in foreign language. Students were surveyed to establish their preference in science and foreign language courses. Does it appear that preferences in science and foreign language are independent? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934398>

Question 114

Which of the following summaries are changed by adding a constant to each data value? I. the mean II. the median III. the standard deviation

A) I and II B) III only C) I and III D) I only E) I, II, and III

Min Q1 Median Q3 Max
13.0 15.0 16.5 18.0 22.0

Which statement is true?

- There are both low and high outliers in the data.
- There are no outliers in the data.
- There is at least one high outlier in the data.
- There is at least one low outlier in the data.
- none of these

The advantage of making a stem-and-leaf display instead of a dotplot is that a stem-and-leaf display

- none of these
 - preserves the individual data values.
 - satisfies the area principle.
 - shows the shape of the distribution better than a dotplot.
 - A stem-and-leaf display is for quantitative data, while a dotplot shows categorical data.
- Suppose that a Normal model described student scores in a history class. Parker has a standardized score (z-score) of +2.5. This means that Parker

- A) has a standard deviation of 2.5.
B) has a score that is 2.5 times the average for the class.
C) none of these
D) is 2.5 standard deviations above average for the class.
E) is 2.5 points above average for the class.
- Q. 5 Your Stats teacher tells you your test score was the 3rd quartile for the class. Which is true?

- I. You got 75 on the test.
II. You can't really tell what this means without knowing the standard deviation.
III. You can't really tell what this means unless the class distribution is nearly Normal.

A) II only B) I only C) III only D) none E) II and III

Q. 6 Two sections of a class took the same quiz. Section A had 15 students who had a mean score of 80, and Section B had 20 students who had a mean score of 90. Overall, what was the approximate mean score for all of the students on the quiz?

- A) 85.7
B) none of these
C) It cannot be determined.
D) 84.3
E) 85.0

Answer: <https://biology-forums.com/index.php?topic=1698346>

Question 115

Blood pressure and cholesterol Suppose that both blood pressure and cholesterol levels of adult women can be described with Normal models, and that the correlation between these variables is 0.60. If a woman's blood pressure places her at the 88th percentile, at what percentile would you predict her cholesterol level to be?

Answer: <https://biology-forums.com/index.php?topic=1934149>

Question 116

Luxury cars According to infoplease, 18.8% of the luxury cars manufactured in 2003 were silver. A large car dealership typically sells 50 luxury cars a month.

- a. Explain why you think that the luxury car sales can be considered Bernoulli trials.
b. What is the probability that the fifth luxury car sold is the first silver one?
c. Let X represent the number of silver luxury cars sold in a typical month. What is the probability model for X ? Specify the model (name and parameters), and tell the mean and standard deviation.

Answer: <https://biology-forums.com/index.php?topic=1934171>

Question 117

A consumer group collected information on HDTVs. They created a linear model to estimate the cost of an HDTV (in \$) based on the screen size (in inches). Which is the most likely value of the slope of the line of best fit?

A) 70 B) 7000 C) 0.70 D) 700 E) 7

Q. 2 The correlation between X and Y is $r = 0.35$. If we double each X value, decrease each Y by 0.20, and interchange the variables (put X on the Y -axis and vice versa), the new correlation

- A) is 0.70.
B) is 0.90.
C) cannot be determined.
D) is 0.35.

Q. 3 The auto insurance industry crashed some test vehicles into a cement barrier at speeds of 5 to 25 mph to investigate the amount of damage to the cars.

They found a correlation of $r = 0.60$ between speed (MPH) and damage (\$). If the speed at which a car hit the barrier is 1.5 standard deviations above the mean speed, we expect the damage to be ___ the mean damage.

- A) 0.60 SD above
B) equal to
C) 0.90 SD above
D) 1.5 SD above

Q. 4 Do you think a model based on these data could accurately predict the average number of strikeouts for a pitcher with an average fastball speed of 70 mph.? Explain.

Q. 5 Do you think the association would be stronger or weaker if we used data from one month of the season?

Q. 6 Do you think there is a pattern? Describe the association between speed

and the number of strikeouts.

What will be an ideal response?
Q. 7
Comment on any unusual data point or points in the data set. Explain.

What will be an ideal response?
Q. 8
Do you think there is a clear pattern? Describe the association between fiber and calories.

What will be an ideal response?

Answer: <https://biology-forums.com/index.php?topic=1698339>

Question 118

Facebook In 2012, the Pew Research Center asked a random sample of Facebook users about their habits with this social media tool. One of the questions asked was about the plans people had for spending time on Facebook in the coming year. They were asked if they planned to more time, less time, or about the same time as now. Respondents were also broken into three age groups. Do these data provide evidence that age is independent of plans for Facebook time? Provide statistical justification for your answer. (www.pewinternet.org)

Answer: <https://biology-forums.com/index.php?topic=1934300>

Question 119

Carpet A store selling carpet tracks the amount of square footage sold to its customers, rounding to the nearest 500 sq. ft. Here is the distribution.

- What is the average expected area sold?
- If the average cost of carpet sold is \$3/sq. ft., what is the average sale price per customer?
- If a salesman completes sales to five customers one day, what do you expect his total sales to be?

Answer: <https://biology-forums.com/index.php?topic=1934458>

Question 120

Match each graph with the appropriate correlation coefficient.

_____ 0.98 _____ 0.73 _____ 0.09 _____ -0.99

Answer: <https://biology-forums.com/index.php?topic=1934081>

Question 121

Basketball player heights Assume the heights of high school basketball players are normally distributed. For boys the mean is 74 inches with a standard deviation of 4.5 inches, while girl players have a mean height of 70 inches and standard deviation 3 inches. At a mixed 2-on-2 tournament teams are formed by randomly pairing boys with girls as teammates.

- On average, how much taller do you expect the boy to be?
- What will be the standard deviation of the difference in teammates' heights?
- On what fraction of the teams would you expect the girl to be taller than the boy?

Answer: <https://biology-forums.com/index.php?topic=1934179>

Question 122

Insurance companies track life expectancy information to assist in determining the cost of life insurance policies. The insurance company knows that, last year, the life expectancy of its policyholders was 77 years. They want to know if their clients this year have a longer life expectancy, on average, so the company randomly samples some of the recently paid policies to see if the mean life expectancy of policyholders has increased. The insurance company will only change their premium structure if there is evidence that people who buy their policies are living longer than before.

For more accurate cost determination, the insurance companies want to estimate the life expectancy to within one year with 95% confidence. How many randomly selected records would they need to have?

Answer: <https://biology-forums.com/index.php?topic=1934234>

Question 123

After conducting a marketing study to see what consumers thought about a new tinted contact lens they were developing, an eyewear company reported, Consumer satisfaction is strongly correlated with eye color. Comment on this observation.

What will be an ideal response?
Q. 2
A study by a prominent psychologist found a moderately strong positive association between the number of hours of sleep a person gets and the person's ability to memorize information.

- Explain in the context of this problem what positive association means.

b. Hoping to improve academic performance, the psychologist recommended the school board allow students to take a nap prior to any assessment. Discuss this reasoning. **Q. 3** After conducting a survey at a pet store to see what affect having a pet had on the condition of the yard, a news reporter stated There appears to be a strong correlation between the owning a pet and the condition of the yard.

Comment on this observation. **Q. 4** Identify what is wrong with each of the following statements:

a. The correlation between Olympic gold medal times for the 800m hurdles and year is -0.66 seconds per year.

b. The correlation between Olympic gold medal times for the 100m dash and year is -1.37.

c. Since the correlation between Olympic gold medal times for the 800m hurdles and 100m dash is -0.41, the correlation between times for the 100m dash and the 800m hurdles is +0.41.

d. If we were to measure Olympic gold medal times for the 800m hurdles in minutes instead of seconds, the correlation would be $-0.66/60 = -0.011$. **Q. 5** After conducting a survey of his students, a professor reported that There appears to be a strong correlation between grade point average and whether or not a student works. Comment on this observation.

What will be an ideal response? **Q. 6** Salary conversions You learn that your company is sending you and several other employees to staff a new office in China.

While there everyone will earn the equivalent of their current salary, converted to Chinese currency at the rate of 8 yuans per dollar. In addition, everyone will earn a weekly foreign living allowance of 200 yuans. For example, since you are earning 1000 per week, your weekly salary in China will be $1000 \times 8 + 200 = 8200$ yuans.

a. Shown are some summary statistics describing the current salaries of this group being sent overseas. Fill in the table to show what these statistics will be for the salaries you all will earn while in China.

Statistic In the US In China

Minimum salary 400

Standard deviation 250

Median 750

IQR 300

b. Among this group of employees going to China, your US salary has a zscore of +1.20. What will your new z-score be, based on everyone's China salary? **Q. 7** Repair bills An automobile service shop reported the summary statistics shown for repair bills (in) for their customers last month.

Min

Q1

Median

Q3

Max

Mean

SD 27

88

132

308

1442

284

140

a. Were any of the bills outliers? Show how you made your decision.

b. After checking out a problem with your car the service manager gives you an estimate of only 90. Is he right to imply that your bill will be unusually low? Explain briefly. **Q. 8** Paying for purchases One day a store tracked the way shoppers paid for their purchases. Their data are summarized in the table.

Cash Check Charge Total

Male 18 10 12 40

Female 18 12 30 60

Total 36 22 42 100

a. What percent of men paid cash?

b. What is the conditional relative frequency distribution of payment method for women?

c. If you wanted to show the association between gender and method of payment visually, what kind of graph would you make? (Just name it.)

d. Is there evidence of an association between gender and method of payment? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1698342>

Question 124

When performing a hypothesis test upon two dependent samples, the variable of interest is

- A) the absolute value of the differences that exist between the matched-pair data.
- B) the data that is the same in both samples.
- C) the differences that exist between the matched-pair data.
- D) all of the combined data.

Q. 2. A state highway patrol official wishes to estimate the number of legally intoxicated drivers on a certain road.

- a) How large a sample is needed in order to be 95 confident that the sample proportion will not differ from the true proportion by more than 2?
- b) Repeat part (a) assuming previous studies found that 75 of the drivers on this road are legally intoxicated.

Q. 3. The mean monthly gasoline bill for one household is greater than 160. If a hypothesis test is performed, how should you interpret a decision that rejects the null hypothesis?

- A) There is sufficient evidence to reject the claim $\mu > 160$.
- B) There is not sufficient evidence to reject the claim $\mu > 160$.
- C) There is sufficient evidence to support the claim $\mu > 160$.
- D) There is not sufficient evidence to support the claim $\mu > 160$.

Q. 4. John has six bills of paper money in the following denominations: 1, 5, 10, 20, 50, and 100. If he selects 3 bills at a time how many groups can be formed?

- A) 10
- B) 15
- C) 20
- D) 30

Q. 5. The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60,000 miles and a standard deviation of 2600 miles.

What is the probability a particular tire of this brand will last longer than 57,400 miles?

- A) 0.7266
- B) 0.2266
- C) 0.8413
- D) 0.1587

Q. 6. A company sponsoring a new Internet search engine wants to collect data on the ease of using it. Which is the best way to collect the data?

- A) sample survey
- B) census
- C) observational study
- D) experiment

Q. 7. In the American version of the Game Roulette, a wheel has 18 black slots, 8 red slots and 2 green slots. All slots are the same size. In a carnival game, a person wagers 2 on the roll of two dice. A person can wager on either red or black.

Green is reserved for the house. If a player wagers 5 on either red or black and that color comes up, they win 10 otherwise they lose their wager.

What is the expected value of playing the game once?

- A) 0.26
- B) -0.50
- C) -0.26
- D) 0.50

Answer: <https://biology-forums.com/index.php?topic=1698196>

Question 125

Here is a scatterplot of weight versus height for students in an introductory statistics class. The men are coded as '1' and appear as circles in the scatterplot; the women are coded as '2' and appear as squares in the scatterplot.

- a. Do you think there is a clear pattern? Describe the association between weight and height.
- b. Comment on any differences you see between men and women in the plot.
- c. Do you think a linear model from the set of all data could accurately predict the weight of a student with height 70 inches? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934359>

Question 126

Height and weight Is the height of a man related to his weight? The regression analysis from a sample of 26 men is shown. (Show work. Don't write hypotheses. Assume the assumptions for inference were satisfied.)

- a. How many degrees of freedom?
- b. What is the value of the t statistic?
- c. What is the P-value?
- d. State your conclusion in context.

Answer: <https://biology-forums.com/index.php?topic=1934290>

Question 127

Test identification Suppose you were asked to analyze each of the situations described below. (NOTE: Do not do these problems!) For each, indicate which procedure you would use (pick the appropriate number from the list), the test statistic (z or t), and, if t, the number of degrees of freedom. A procedure may be used more than once.

- a. A personal trainer would like to know if a newly designed bootcamp regimen will significantly build body mass index (BMI). In an effort to test this,

the trainer recorded the BMI for 15 different clients prior to the bootcamp and after the bootcamp. The trainer assumes the BMI's are approximately normal. Does the bootcamp regimen as advertised?

b. In a study to determine whether there is a difference between the average jail time black and white offenders of minor drug possession are sentenced to, the law students randomly selected 25 cases of each type that resulted in jail sentences during the previous year. A 90% confidence interval was created from the results.

c. A bank branch manager is interested in estimating the average wait time for customers in the teller line. The manager records the times for 40 randomly chosen customers. Estimate the wait time with a 95% confidence interval.

d. A New York City mayoral candidate wants to assess his constituent's opinions on the controversial "Stop and Frisk" police tactics. A sample of voters from 2 boroughs (Queens and Brooklyn) is selected and asked if they approve of this policy. Do the approval rates vary from each other?

e. Is there more gun violence in the summer heat than the winter cold? We get records of the number of gunshot wounds in January and July in a random sample of 50 emergency rooms.

f. A board of directors of a local homeowner's association union organization wishes to amend the bylaws. A sample of the residents revealed 310 of 430 were in favor of the amendment. Does the board of directors have the required 75% majority?

Answer: <https://biology-forums.com/index.php?topic=1934514>

Question 128

Halloween is a fun night. It seems that older children might get more candy because they can travel further while trick-or-treating. But perhaps the youngest kids get extra candy because they are so cute. Here are some data that examine this question, along with the regression output.

Based on the graph and the regression output, what conclusions do you draw regarding the relationship between age and the number of pieces of candy a trick-or-treater collects?

Answer: <https://biology-forums.com/index.php?topic=1934367>

Question 129

The following scatterplot shows the relationship between the time (in seconds) it took men to run the 1500m race for the gold medal and the year of the Olympics that the race was run in:

a. Write a few sentences describing the association.

b. Estimate the correlation. $r =$

Answer: <https://biology-forums.com/index.php?topic=1934344>

Question 130

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.

Create a model to predict postal rates from the year.

Answer: <https://biology-forums.com/index.php?topic=1934119>

Question 131

A brake and muffler shop reported the repair bills, in dollars, for their customers yesterday. 8828331229017215440038134618120311814325222756192292213422

a. Sketch a histogram for these data.

b. Find the mean and standard deviation of the repair costs.

c. Is it appropriate to use the mean and standard deviation to summarize these data? Explain.

d. Describe the distribution of repair costs.

Answer: <https://biology-forums.com/index.php?topic=1934056>

Question 132

One of your classmates is reading through the program for Friday night's football game. Among other things, the program lists the players' positions and their weights. Your classmate comments, "There is a strong correlation between a player's position and their weight."

a. Explain why your classmate's statement is in error.

b. What other variable might be listed in the program that could be used to correctly identify a correlation with weight?

Answer: <https://biology-forums.com/index.php?topic=1934078>

Question 133

Researchers plan to investigate a new medication that may reduce blood pressure for individuals with higher than average blood pressure. 90 volunteers with higher than average blood pressure are solicited. Volunteers are randomly assign 100 mg of the medicine, 200 mg of the medicine, or a placebo. Blood pressure will be measured at the beginning and at the conclusion of the study.

Identify the subjects.

Answer: <https://biology-forums.com/index.php?topic=1934387>

Question 134

The measure of variation that is most affected by outliers is the:

A) range. B) interquartile range.

C) standard deviation. D) variance.

A) Random selection of subjects

B) Replication of the on a sufficient number of subjects

C) All of these are important.

D) Control of known sources of variability

E) Random assignment of subjects to treatments

A) class marks. B) lower class limits. C) upper class limits. D) class boundaries.

A) the median B) the mean C) the first quartile D) the midrange

A) 0.278 B) 0.000 C) 0.18 D) 0.123

A) stratified random sample B) cluster sample

C) systematic sample D) simple random sample

Indicate whether the statement is true or false

Answer: <https://biology-forums.com/index.php?topic=1698180>

Question 135

A random sample of 13 men and 19 women in a college class reported their grade point averages (GPAs). Here are histograms from the data: Summary statistics for these data are:

A woman in the class says that she believes that college women tend to have higher GPAs than do college men. Does this sample support her claim? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934240>

Question 136

Preservative Leather furniture used in public places can fade, crack, and deteriorate rapidly. An airport manager wants to see if a leather preservative spray can make the furniture look good longer. He buys eight new leather chairs and places them in the waiting area, four near the south-facing windows and the other four set back from the windows as shown. He assigned the chairs randomly to these spots.

a. Use the random numbers given to decide which chairs to spray. Explain your method clearly.

3 2 2 1 9 0 0 5 9 7 8 6 3 7 4

b. Briefly explain why your assignment strategy is important in helping the manager assess the effectiveness of the leather preservative.

Answer: <https://biology-forums.com/index.php?topic=1934395>

Question 137

Which of the following is not required in an experimental design?

A) blocking

B) All of these are required in an experimental design.

C) control

D) randomization

E) replication

A) response bias

B) voluntary response bias

- C) none of these
- D) nonresponse bias

E) undercoverage
Q. 3/ More dogs are being diagnosed with thyroid problems than have been diagnosed in the past. A researcher identified 50 puppies without thyroid problems and kept records of their diets for several years to see if any developed thyroid problems.

This is a(n)

- A) prospective study
- B) randomized experiment
- C) blocked experiment
- D) survey

E) retrospective study
Q. 4/ A basketball player has a 70 free throw percentage. Which plan could be used to simulate the number of free throws she will make in her next five free throw attempts?

I. Let 0,1 represent making the first shot, 2, 3 represent making the second shot,, 8, 9 represent making the fifth shot. Generate five random numbers 0-9, ignoring repeats.

II. Let 0, 1, 2 represent missing a shot and 3, 4,, 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9.

III. Let 0, 1, 2 represent missing a shot and 3, 4,, 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9, ignoring repeats.

A) I, II, and III B) II and III C) II only D) I only E) III only
Q. 5/ Suppose a school district decides to randomly test high school students for attention deficit disorder (ADD). There are three high schools in the district, each with grades 9-12.

The school board pools all of the students together and randomly samples 250 students. Is this a simple random sample?

- A) Yes, because each student is equally likely to be chosen.
- B) Yes, because they could have chosen any 250 students from the district.
- C) Yes, because the students were chosen at random.
- D) No, because we can't guarantee that students from each school in the sample.
- E) No, because we can't guarantee that students from each grade in the sample.

Q. 6/ The January 2005 Gallup Youth Survey telephoned a random sample of 1,028 U.S. teens and asked these teens to name their favorite movie from 2004. Napoleon Dynamite had the highest percentage with 8 of teens ranking it as their favorite movie.

Which is true?

- I. The population of interest is all U.S. teens.
- II. 8 is a statistic and not the actual percentage of all U.S. teens who would rank this movie as their favorite.
- III. This sampling design should provide a reasonably accurate estimate of the actual percentage of all U.S. teens who would rank this movie as their favorite.

A) II only B) I only C) III only D) I, II, and III E) I and II
Q. 7/ Suppose a man has ordered twelve 1-gallon paint cans of a particular color (lilac) from the local paint store in order to paint his mother's house. Unknown to the man, three of these cans contains an incorrect mix of paint.

For this weekend's big project, the man randomly selects four of these 1-gallon cans to paint his mother's living room. Let x = the number of the paint cans selected that are defective. Unknown to the man, x follows a hypergeometric distribution. Find the mean of this distribution.

A) 3 B) 1 C) 12 D) 4
Q. 8/ Given that x is a hypergeometric random variable with $N = 9$, $n = 3$, and $r = 5$, compute the standard deviation of x .

- A) .208 B) .456 C) .745 D) .556

Answer: <https://biology-forums.com/index.php?topic=1698030>

Question 138

For purposes of making budget plans for staffing, a college reviewed student's year in school and area of study. Of the students, 22.5% are seniors, 25% are juniors, 25% are sophomores, and the rest are freshmen. Also, 40% of the seniors major in the area of humanities, as did 39% of the juniors, 40% of the sophomores, and 36% of the freshmen. What is the probability that a randomly selected humanities major is a junior? Show your work.

Answer: <https://biology-forums.com/index.php?topic=1934399>

Question 139

Poverty In a study of how the burden of poverty varies among U.S. regions, a random sample of 1000 individuals from each region of the United States recently yielded the information on poverty (based on defining the poverty level as an income below \$10,400 for a family of 4 people). The data are provided in the table below. (All the conditions are satisfied - don't worry about checking them.)

- a. Write appropriate hypotheses.
- b. How many degrees of freedom?
- c. Suppose the expected values had not been given. Show exactly how to calculate the expected count in the first cell.

d. State your complete conclusion in context.

Answer: <https://biology-forums.com/index.php?topic=1934520>

Question 140

Smoking State public health officials claim that 18% of adults currently smoke cigarettes.

- We start selecting a few adults at random, asking each if he or she is a smoker. Explain why these can be considered Bernoulli trials.
- How many people do you expect to have to ask in order to find a smoker?
- Let X represent the number of smokers among a randomly chosen sample of 30 adults. What is the probability model for X ? Name the model (including its parameters) and specify the mean and standard deviation of X .
- What is the probability that there are at least 8 smokers among our sample of 30 people?

Answer: <https://biology-forums.com/index.php?topic=1934444>

Question 141

Associations For each pair of variables, indicate what association you expect: positive(+), negative(-), curved(C), or none (N).

- power level setting of a microwave; number of minutes it takes to boil water
- number of days it rained in a month (during the summer); number of times you mowed your lawn that month
- number of hours a person has been up past a normal bedtime; number of minutes it takes the person to do a crossword puzzle
- number of hockey games played in Minnesota during a week; sales of suntan lotion in Minnesota during that week
- length of a student's hair; number of credits the student earned last year

Answer: <https://biology-forums.com/index.php?topic=1934092>

Question 142

The countries of Europe report that 46% of the labor force is female. The United Nations wonders if the percentage of females in the labor force is the same in the United States. Representatives from the United States Department of Labor plan to check a random sample of over 10,000 employment records on file to estimate a percentage of females in the United States labor force.

The representatives from the Department of Labor want to estimate a percentage of females in the United States labor force to within $\pm 5\%$, with 90% confidence. How many employment records should they sample?

Answer: <https://biology-forums.com/index.php?topic=1934474>

Question 143

The boxplots show prices of used cars (in thousands of dollars) advertised for sale at three different car dealers.

- Which dealer offers the cheapest car offered, and at what price?
- Which dealer has the lowest median price, and how much is it?
- Which dealer has the smallest price range, and what is it?
- Which dealer's prices have the smallest IQR, and what is it?
- Which dealer generally sells cars cheapest? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934061>

Question 144

For purposes of making on-campus housing assignments, a college classifies its students as Priority A (seniors), Priority B (juniors), and Priority C (freshmen and sophomores). Of the students who choose to live on campus, 10% are seniors, 20% are juniors, and the rest are underclassmen. The most desirable dorm is the newly constructed Gold dorm, and 60% of the seniors elect to live there. 15% of the juniors also live there, along with only 5% of the freshmen and sophomores. What is the probability that a randomly selected resident of the Gold dorm is a senior? Show your work clearly.

Answer: <https://biology-forums.com/index.php?topic=1934402>

Question 145

Heights American females aged 20 to 29 years old have heights that are approximately normally distributed with a mean of 64.5 inches and a standard deviation of 2.5 inches.

- If you randomly select 10 females in this age range, what is the probability that the mean height of the women in the sample is more than 67 inches?
- The middle 95% of heights of females in this age range are between what two heights?

Answer: <https://biology-forums.com/index.php?topic=1934227>

Question 146

Births A city has two hospitals, with many more births recorded at the larger hospital than at the smaller one. Records indicate that in general babies are about equally likely to be boys or girls, but the actual gender ratio varies from week to week. Which hospital is more likely to report a week when over two-thirds of the babies born were girls? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934215>

Question 147

Seatbelts Safety officials hope a public information campaign will increase the use of seatbelts above the current 70% level. Their efforts include running radio and TV ads, putting up billboards, having police officers appear on talk shows, and getting newspapers to indicate whether people injured in accidents were belted in. After several months they check the effectiveness of this campaign with a statewide survey of 560 randomly chosen drivers. 407 of those drivers report that they wear a seatbelt.

- Verify that a Normal model is a good approximation for the binomial model in this situation.
- Does the survey result suggest that the education/advertising campaign was effective? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934445>

Question 148

A survey of families revealed that 58% of all families eat turkey at holiday meals, 44% eat ham, and 16% have both turkey and ham to eat at holiday meals.

- What is the probability that a family selected at random had neither turkey nor ham at their holiday meal?
- What is the probability that a family selected at random had only ham without having turkey at their holiday meal?
- What is the probability that a randomly selected family having turkey had ham at their holiday meal?
- Are having turkey and having ham disjoint events? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934397>

Question 149

Hardwood mulch Hardwood mulch is sold by the cubic yard. (But they just call it 'yards' to be confusing.) One lawn and garden store has a truck that they say can carry up to 7 yards for delivery. (It can actually hold a bit more.) Of course, when they fill the truck they don't get exactly 7 yards of mulch. They weigh it to determine the actual amount for billing purposes. They charge \$28 per yard for the mulch, plus \$25 for delivery.

- Shown are some summary statistics describing the distribution of the actual amounts of mulch in full loads. Fill in the table to include those statistics for the cost including delivery.
- Your delivery is among this set of data, and it has a z-score of -0.84 for the distribution of yards of mulch. What is your z-score for the cost including delivery?

Answer: <https://biology-forums.com/index.php?topic=1934342>

Question 150

Personal debt According to The World Almanac and Book of Facts 2004, the debt per capita for the years 1990-2001 gives the following scatterplot:

Regression output gives the equation of the regression line as
 $= -2,231,226 + 1128(\text{Year})$ with $R^2 = 98.8\%$.

- What is the response variable?
- What is the correlation coefficient r ?
- Explain in context what the slope of the line means.
- Explain in context what $R^2 = 98.8\%$ means.
- You decide to take a look at a residuals plot before making any predictions. Based on the following residuals plot, does linear regression seem appropriate for these data? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934136>

Question 151

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.

Make a scatterplot and describe the association between the year and the first class postal rate.

Answer: <https://biology-forums.com/index.php?topic=1934118>

Question 152

Passing the test Assume that 70% of teenagers who go to take the written drivers license test have studied for the test. Of those who study for the test, 95% pass; of those who do not study for the test, 60% pass. What is the probability that a teenager who passes the written drivers license test did not study for the test?

Answer: <https://biology-forums.com/index.php?topic=1934441>

Question 153

Book sales A publishing company pays its sales staff 600 a week plus a commission of 0.50 per book sold. For example, a salesman who sold 440

books earned $600 + 0.50(440) = 820$.

a. The table shows summary statistics for the number of books the large sales staff sold last week. Fill in the table to show the statistics for the pay these people earned.

Statistic	Books Sold	Earned
Mean	640	
St. dev.	360	
IQR	450	
Maximum	1420	

b. The newest employee had a pretty good week. Among all the salespeople her pay corresponded to a z-score of +1.80. What was the z-score of the number of books she sold?

Transportation

Job Class	Car	Bus	Train	Total
Management	26	20	44	90
Labor	56	106	168	330
Total	82	126	212	420

a. What is the marginal distribution (in %) of mode of transportation?

Car _____ Bus _____ Train _____

b. What is the conditional distribution (in %) of mode of transportation for management?

Car _____ Bus _____ Train _____

c. What kind of display would you use to show the association between job class and mode of transportation? (Just name a graph.)

d. Do job classification and mode of transportation appear to be independent? Give statistical evidence to support your conclusion.

A) get 2.2 miles per gallon.

B) achieve fuel economy that is 2.2 standard deviations better than the average car.

C) get 2.2 mpg more than the average car.

D) have a standard deviation of 2.2 mpg.

E) get 2.2 times the gas mileage of the average car.

I. The page counts for those ink cartridges will be normally distributed. II. The histogram for those page counts will be symmetric. III. 95 of those page counts will be within 2 standard deviations of the mean.

A) I, II, and III B) I only C) II only D) none E) II and III

A) dotplot

B) boxplot

C) any of these would work

D) histogram

E) stem-and-leaf plot

A) 69 mph

B) 68 mph

C) It cannot be determined.

D) 67 mph

E) none of those

Answer: <https://biology-forums.com/index.php?topic=1698344>

Question 154

Internet access A recent Gallup poll found that 28% of U.S. teens aged 13-17 have a computer with Internet access in their rooms. The poll was based on a random sample of 1028 teens and reported a margin of error of $\pm 3\%$. What level of confidence did Gallup use for this poll?

Answer: <https://biology-forums.com/index.php?topic=1934187>

Question 155

In a problem involving the hypergeometric distribution, the probability of success remains the same from trial to trial.

Indicate whether the statement is true or false
Q. 2/ A food packaging company must maintain a consistent weight per can. A quality control engineer randomly selects 60 cans of corn of the same size and records the weight of each.

- Identify the population of interest.
- Describe the sample.

Q. 3/ If the multiple correlation coefficient is 0.80, then the proportion of total variation in y that can be attributed to the x s is _____ .

Fill in the blank(s) with correct word
Q. 4/ When we are comparing two populations and our two samples are such that each element of one sample relates to a particular element of the other sample, an appropriate nonparametric test would be the

A) one-sample sign test. B) signed-rank test.

Q. 5/ The variance of the sampling distribution can be equal to the variance of the population.

Indicate whether the statement is true or false
Q. 6/ Can watching a movie temporarily raise your pulse rate? Researchers have 50 volunteers check their pulse rates. Then they watch an action film, after which they take check their pulse rates once more.

Which aspect of experimentation is present in this research?

- blinding
- randomization
- a placebo
- a control group

Q. 7/ In constructing a frequency distribution from raw data, there will usually be between _____ and _____ classes.

Fill in the blank(s) with correct word
Q. 8/ The expected value with perfect information is calculated by subtracting the maximum expected profit under uncertainty from _____ .

Fill in the blank(s) with correct word

Answer: <https://biology-forums.com/index.php?topic=1698152>

Question 156

If the apartment numbers in a large building are looked upon as data, they would fall into the _____ category.

A) nominal B) ordinal C) interval D) ratio
Q. 2/ Suppose the state decides to randomly test high school wrestlers for steroid use. There are 16 teams in the league, and each team has 20 wrestlers.

State investigators plan to test 32 of these athletes by randomly choosing two wrestlers from each team. Is this a simple random sample?

- No, because not all possible groups of 32 wrestlers could have been the sample.
- Yes, because each wrestler is equally likely to be chosen.
- No, because a random sample of teams was not first chosen.
- Yes, because stratified samples are a type of simple random sample.

Q. 3/ True or False: The trials of a binomial experiment must be mutually exclusive of each other.

A) False B) True
Q. 4/ If $P(X) = 0.4$ and $P(Y) = 0.5$, and if X and Y are mutually exclusive, find $P(X')$.

A) 0.5 B) 0.6 C) 0.4 D) 0.9
Q. 5/ Construct a 95 confidence interval for the population mean, μ . Assume the population has a normal distribution. A sample of 25 randomly

English majors has a mean test score of 81.5 with a standard deviation of 10.2. Round to the nearest hundredth.

A) (77.29, 85.71) B) (87.12, 98.32) C) (56.12, 78.34) D) (66.35, 69.89)
Q. 6/ Find the z-scores for which 90 of the distribution's area lies between $-z$ and z .

A) (-2.33, 2.33) B) (-1.645, 1.645) C) (-0.99, 0.99) D) (-1.96, 1.96)

Answer: <https://biology-forums.com/index.php?topic=1698184>

Question 157

Peanut M&Ms According to the Mars Candy Company, peanut M&M's are 12% brown, 15% yellow, 12% red, 23% blue, 23% orange, and 15% green. On a Saturday when you have run out of statistics homework, you decide to test this claim. You purchase a medium bag of peanut M&M's and find 39 browns, 44 yellows, 36 red, 78 blue, 73 orange, and 48 greens. Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934292>

Question 158

Consider the following part of a data set:

List the variables in the data set. Indicate whether each variable is treated as categorical or quantitative in this data set. If the variable is quantitative, state the units.

Answer: <https://biology-forums.com/index.php?topic=1934041>

Question 159

A small business just leased a new computer and color laser printer for three years. The service contract for the computer offers unlimited repairs for a fee of \$100 a year plus a \$25 service charge for each repair needed. The company's research suggested that during a given year 86% of these computers needed no repairs, 9% needed to be repaired once, 4% twice, 1% three times, and none required more than three repairs.

The service contract for the printer estimates a mean annual cost of \$120 with standard deviation of \$30. What is the expected value and standard deviation of the total cost for the service contracts on computer and printer?

Answer: <https://biology-forums.com/index.php?topic=1934415>

Question 160

A large manufacturer of batteries knows that, historically, 10% of its batteries come off the production line defective, and the remaining 90% of batteries come off the production line in working condition. Conduct a simulation to estimate how many batteries the company needs to pull off the production line in order to be sure of ending up with 10 working batteries.

Describe how you will use a random number table to conduct this simulation.

Answer: <https://biology-forums.com/index.php?topic=1934380>

Question 161

Researchers investigating the association between the size and strength of muscles measured the forearm circumference (in inches) of 20 teenage boys. Then they measured the strength of the boys' grips (in pounds). Their data are plotted below.

- Write a few sentences describing the association.
- Estimate the correlation. $r =$ _____
- If the point in the lower right corner (at about 14" and 38 lbs.) were removed, would the correlation become stronger, weaker, or remain about the same?
- If the point in the upper right corner (at about 15" and 75 lbs.) were removed, would the correlation become stronger, weaker, or remain about the same?

Answer: <https://biology-forums.com/index.php?topic=1934077>

Question 162

The probability of Leon getting a speeding ticket this year is 0.8, and the probability of him getting a second speeding ticket given that he already has one this year is 0.9. What is the probability that he will get two tickets this year?

A) 0.8 B) 0.72 C) 1.70 D) 0.9

Q. 2/ If the mean of a set of raw data is subtracted from each of the numbers, the mean of the new set of data is

Q. 3/ Aggressiveness A recent study evaluated elementary age children for aggressiveness. This study found that the children who played video games were more likely to engage in aggressive or violent play at school.

The researchers said the difference was statistically significant.

- Briefly explain what statistically significant means in this context.
- The news media reported that this study proved that playing computer games causes children to be aggressive or violent. Briefly explain why this conclusion is not justified.
- But perhaps it is true. We wonder if playing computer games can lead to aggressive or violent behavior in elementary school children. We find 50 young children whose families volunteer to participate in our research. Design an appropriate experiment. (You need not explain how to randomize.)

Q. 4/ If paired data plotted on log-log paper fall close to a straight line, we would expect a parabola

to provide a good fit for the data.

Indicate whether the statement is true or false. Q. 5. _____ occurs when those conducting a survey or study are unable to obtain data on all experimental units in the sample.

Fill in the blank(s) with correct word. Q. 6. In an F ratio for a one-way ANOVA, the numerator degrees of freedom is _____.

Fill in the blank(s) with correct word. Q. 7. A class mark is defined as the average of _____.

Fill in the blank(s) with correct word

Answer: <https://biology-forums.com/index.php?topic=1698140>

Question 163

One common method of evaluating the performance of a mutual fund is to compare its returns to those of a recognized benchmark such as an index of the returns on all securities of the type that the fund accumulates. The Janus Worldwide Fund considers its benchmark to be the MSCI World IndexSM. The table below depicts the annual returns (percent) for a recent ten-year period. Is this fund a good investment? That is, does this fund significantly outperform its benchmark?

Source:

[https://ww3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20\(Janus%20Worldwide%20Fund-Class%20A\)_exp%2004-15-13.pdf](https://ww3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20(Janus%20Worldwide%20Fund-Class%20A)_exp%2004-15-13.pdf)

Explain clearly whether this data should be analyzed using a 2-sample t test approach or a match pairs t-test method.

Answer: <https://biology-forums.com/index.php?topic=1934253>

Question 164

In November 2003 Discover published an article on the colonies of ants. They reported some basic information about many species of ants and the results of some discoveries found by myrmecologist Walter Tschinkel of the University of Florida. Information included the scientific name of the ant species, the geographic location, the depth of the nest (in feet), the number of chambers in the nest, and the number of ants in the colony. The article documented how new ant colonies begin, the ant-nest design, and how nests differ in shape, number, size of chambers, and how they are connected, depending on the species. It reported that nest designs include vertical, horizontal, or inclined tunnels for movement and transport of food and ants. List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.

Answer: <https://biology-forums.com/index.php?topic=1934043>

Question 165

Penicillin Doctors studying how the human body assimilates medication inject some patients with penicillin, and then monitor the concentration of the drug (in units/cc) in the patients' blood for seven hours. The data are shown in the scatterplot. First they tried to fit a linear model. The regression analysis and residuals plot are shown.

- Find the correlation between time and concentration.
- Using this model, estimate what the concentration of penicillin will be after 4 hours.
- Is that estimate likely to be accurate, too low, or too high? Explain.

Now the researchers try a new model, using the re-expression $\log(\text{Concentration})$. Examine the regression analysis and the residuals plot below.

- Explain why you think this model is better than the original linear model.
- Using this new model, estimate the concentration of penicillin after 4 hours.

Answer: <https://biology-forums.com/index.php?topic=1934126>

Question 166

A soft drink company is conducting research to select a new design for the can. A random sample of participants has been selected. Instead of a typical taste test with two different sodas, they actually give each participant the same soda twice. One drink is served in a predominantly red can, the other in a predominantly blue can. The order is chosen randomly. Participants are asked to rate each drink on a scale of 1 to 10. Thus, the company wishes to test if the color of the can influences the rating. The ratings were recorded for each participant. The data are shown in the table below. Does this sample indicate that there is a difference in the ratings? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934252>

Question 167

A random sample of 4000 U.S. citizens yielded 2250 who are in favor of gun control legislation. Estimate the true proportion of all Americans who are in favor of gun control legislation using a 90 confidence interval.

A) .5625 .4048 B) .4375 .4048 C) .5625 .0129 D) .4375 .0129. Q. 2. Transportation officials tell us that 90 of drivers wear seat belts while driving. What is the probability of observing 511 or fewer drivers wearing seat belts in a sample of 600 drivers?

A) approximately 1 B) 0.1 C) approximately 0 D) 0.9
Q. 3/ The number of goals scored at each game by a certain hockey team follows a Poisson distribution with a mean of 4 goals per game. Find the probability that the team scored exactly seven goals in each of two randomly selected games.

A) 0.00354505 B) 0.88091927 C) 0.11908073 D) 0.00000145
Q. 4/ Name and describe the kind of bias that might be present if the management decides that instead of subjecting people to random testing they'll just

- Hold department meetings and drug test the employees that attend.
- Offer additional employee discounts for those employees who agree to be drug tested.

Administrators at a large hospital are concerned about the possibility of drug abuse by people who work there. They decide to check on the extent of the problem by having a random sample of the employees undergo a drug test. Several plans for choosing the sample are proposed.

- There are four employee classifications: doctors, medical staff (nurses, technicians, etc.) office staff, and support staff (custodians, maintenance, etc.). Randomly select ten people from each category.
 - Each employee has a 4-digit ID number. Randomly choose 40 numbers.
 - At the start of each shift, choose every tenth person who arrives for work.
 - Randomly select five departments and test all the people who work in those department - doctors, nurses, technicians, clerks, custodians, etc.
- Q. 5/ A random sample of 4000 U.S. citizens yielded 2150 who are in favor of gun control legislation. Find the point estimate for estimating the proportion of all Americans who are in favor of gun control legislation.

A) .5375 B) .4625 C) 4000 D) 2150
Q. 6/ Transportation officials tell us that 60 of drivers wear seat belts while driving. Find the probability that more than 409 drivers in a sample of 650 drivers wear seat belts.

A) 0.6 B) 0.9406 C) 0.0594 D) 0.4
Q. 7/ The number of goals scored at each game by a certain hockey team follows a Poisson distribution with a mean of 6 goals per game. Find the probability that the team will score more than three goals during a game.

A) 0.151204 B) 0.938031 C) 0.848796 D) 0.061969
Q. 8/ One manager suggesting just going to the stores in the city where the company is headquartered so they wouldn't have to travel far. What type of sampling would this be? Explain why this method is biased.

Be sure to name the kind(s) of bias you describe and link it to the variable of interest.

Answer: <https://biology-forums.com/index.php?topic=1698044>

Question 168

Associations For each pair of variables, indicate what association you expect: positive linear(+), negative linear(-), curved(C), or none(N).

- the number of hours in the sun; the number of mold cultures on a piece of bread
- the number of hours a store is open; the number of sales the store has
- the number of hours you practice golf; your golf score
- the price of gasoline; the number of families that take summer road trips
- the size of a front lawn; the number of children who live in the house

Answer: <https://biology-forums.com/index.php?topic=1934106>

Question 169

Annual review You are up for your annual job performance review. You estimate there's a 30% chance you'll get a promotion, a 40% chance of a raise, and a 20% chance of getting both a raise and a promotion.

- Find the probability that you get a raise or promotion.
- Are the raise and the promotion independent events? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934177>

Question 170

Match the following descriptions with the most likely correlation coefficient.

- The number of hours you study and your exam score.
- The number of siblings you have and your GPA.
- The number of hours you practice a task and the number of minutes it takes you to complete it.
- The number of hours you use a pencil and its length.

A. -0.78 B. 0.13 C. 0.46 D. 0.89

Answer: <https://biology-forums.com/index.php?topic=1934079>

Question 171

Cigarette taxes New York public health officials report that currently 22% of adults smoke

They hope that newly increased state cigarette taxes will reduce this rate. They plan to check in December by selecting a random sample of 1200 New Yorkers to estimate again the percentage of adults who smoke.

- Verify that a Normal model is a useful approximation for the binomial in this situation.
- In that December sample, how many smokers would it take to convince you that the percentage of NY adults who smoke had decreased significantly? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934181>

Question 172

It is generally believed that electrical problems affect about 14% of new cars. An automobile mechanic conducts diagnostic tests on 128 new cars on the lot.

- Describe the sampling distribution for the sample proportion by naming the model and telling its mean and standard deviation. Justify your answer.
- Sketch and clearly label the model.
- What is the probability that in this group over 18% of the new cars will be found to have electrical problems?

Answer: <https://biology-forums.com/index.php?topic=1934463>

Question 173

A teacher wants to see if two different forms of an exam are equivalent or if one of the exams is more difficult than the other. She has 120 students, which she randomly sorts into two groups of 60. The group that takes exam A has a mean score of 78.1% with a standard deviation of 5.6%. Exam B scores an average of 74.8% with a standard deviation of 8.7%.

Do these scores provide convincing statistical evidence that there is a difference in the difficulty of the two exams?

Answer: <https://biology-forums.com/index.php?topic=1934246>

Question 174

Wingspan A person's wingspan is the distance from fingertip to fingertip when their arms are fully extended. The longer a person's wingspan, the taller they tend to be. Regression analysis was executed on 24 individuals to see if height in inches can be used to predict wingspan (also in inches). The conditions for inference were deemed to be reasonably satisfied.

Dependent Variable: Wingspan

Sample size: 24

R-sq = 0.8026696

s: 2.1512606

- Write the equation of the regression line. Make sure to define all the variables in your equation.
- Interpret the slope of the regression equation in context.
- Interpret the value of s in context.
- Find and interpret a 95% confidence interval for slope.
- Is the relationship between wingspan and height a strong relationship? Why? Give two reasons to justify your answer.

Answer: <https://biology-forums.com/index.php?topic=1934302>

Question 175

Scrubbers A factory recently installed new pollution control equipment ("scrubbers") on its smokestacks in hopes of reducing air pollution levels at a nearby national park. Randomly timed measurements of sulfate levels (in micrograms per cubic meter) were taken before (Set C1) and after (Set C2) the installation. We believe that measurements of sulfate levels are normally distributed. Write a complete conclusion about the effectiveness of these scrubbers based on the statistical software printout shown below.

Answer: <https://biology-forums.com/index.php?topic=1934504>

Question 176

City planners wanted to know how many people live in a typical housing unit so they compiled data from hundreds of forms that had been submitted in various city offices. Summary statistics are shown in the table.

- Notice that the minimum occupancy and the first quartile are the same. Explain how this can be.
- The city classifies residences housing 4 or more people as "high occupancy". Would you consider 4 occupants to be unusually high? Explain.
- The city bases their garbage disposal fee on the occupancy level of the home or apartment. The annual fee is \$40 plus \$5 per person, so a single occupant pays \$45 and the homes with 10 people pay a year. What is the median fee paid? And the IQR?
- What are the mean and standard deviation of the garbage disposal fees?

Answer: <https://biology-forums.com/index.php?topic=1934330>

Question 177

In July 2013, the Federal Drug Administration approved a new version of a drug used to treat opium dependence. The old version of the drug had received complaints about a bitter taste, an aftertaste, and that it took a long time to dissolve. The goal of the new version was to get more patients to

take the drug as prescribed by addressing these issues. In addition to these improvements, experimenters monitored the existence and types of side effects of the drug.

List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.

Answer: <https://biology-forums.com/index.php?topic=1934047>

Question 178

Textbook authors must be careful that the reading level of their book is appropriate for the target audience. Some methods of assessing reading level require estimating the average word length. We've randomly chosen 20 words from a randomly selected page in Stats: Modeling the World and counted the number of letters in each word: 5, 5, 2, 11, 1, 5, 3, 8, 5, 4, 7, 2, 9, 4, 8, 10, 4, 5, 6, 6

For a more definitive evaluation of reading level the editor wants to estimate the text's word length to within 0.5 letters with 98% confidence. How many randomly selected words does she need to use?

Answer: <https://biology-forums.com/index.php?topic=1934236>

Question 179

A researcher notes that there is a positive correlation between the temperature on a summer day and the number of bees that he can count in his garden over a 5-minute time span.

- Describe what the researcher means by a positive correlation.
- If the researcher calculates the correlation coefficient using degrees Fahrenheit instead of Celsius, will the value be different?

Answer: <https://biology-forums.com/index.php?topic=1934080>

Question 180

Most people are definitely dominant on one side of their body - either right or left. For some sports being able to use both sides is an advantage, such as batting in baseball or softball. In order to determine if there is a difference in strength between the dominant and non-dominant sides, a few switch-hitting members of some school baseball and softball teams were asked to hit from both sides of the plate during batting practice. The longest hit (in feet) from each side was recorded for each player. The data are shown in the table below. Does this sample indicate that there is a difference in the distance a ball is hit by batters who are switch-hitters?

Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934250>

Question 181

Residuals are . . .

- none of these
 - possible models not explored by the researcher.
 - variation in the data that is explained by the model.
 - data collected from individuals that is not consistent with the rest of the group.
 - the difference between observed responses and values predicted by the model.
- Q. 2 All but one of these statements contain a mistake. Which could be true?

- There is a high correlation (1.09) between height of a corn stalk and its age in weeks.
 - The correlation between the amount of fertilizer used and the yield of beans is 0.42.
 - The correlation between a car's length and its fuel efficiency is 0.71 miles per gallon.
 - The correlation between a football player's weight and the position he plays is 0.54.
 - There is a correlation of 0.63 between gender and political party.
- Q. 3 Email At CPU every student gets a college email address. Data collected by the college showed a negative association between student grades and the number of emails the student sent during the semester.

- Briefly explain what negative association means in this context.
 - After seeing this study the college proposes trying to improve academic performance by limiting the amount of email students can send through the college address. As a statistician, what do you think of this plan? Explain briefly.
- Q. 4 For each pair of variables, indicate what association you expect: positive(+), negative(-), curved(C), or none(N).

- the number of miles a student lives from school; the student's GPA
 - a person's blood alcohol level; time it takes the person to solve a maze
 - weekly sales of hot chocolate at a Montana diner; the number of auto accidents that week in that town
 - the price charged for fund-raising candy bars; number of candy bars sold
 - the amount of rainfall during growing season; the crop yield (bushels per acre)
- Q. 5 Medical records indicate that people with more education tend to live longer; the correlation is 0.48.

The slope of the linear model that predicts lifespan from years of education suggests that on average people tend to live 0.8 extra years for each additional year of education they have. The slope of the line that would predict years of education from lifespan is

A) 1.67 B) 0.288 C) 0.384 D) 0.8 E) 1.25

Suppose we collect data hoping to be able to estimate the prices of commonly owned new cars (in \$) from their lengths (in feet). Of these possibilities, the slope of the line of best fit is most likely to be

- A) 300 B) 30,000 C) 30 D) 3 E) 3000
- I. The correlation between chest size and weight pressed is $r = 0.80$
II. As a player gets stronger and presses more weight his chest will get bigger.
III. A positive residual means that the player pressed more than predicted.

A) III only B) I only C) I and III D) none E) I and II

Answer: <https://biology-forums.com/index.php?topic=1698337>

Question 182

Carbon dating QuarkNet, a project funded by the National Science Foundation and the U.S. Department of Energy, poses the following problem on its website:

"Last year, deep within the Soudan mine, QuarkNet teachers began a long-term experiment to measure the amount of carbon-14 remaining in an initial 100-gram sample at 2000-year intervals. The experiment will be complete in the year 32001. Fortunately, a method for sending information backwards in time will be discovered in the year 29998, so, although the experiment is far from over, the results are in."

A scatterplot of the data looks like:

- a. Straighten the scatterplot by re-expressing these data and create an appropriate model for predicting the mass from the year.
b. Use your model to estimate what the mass will be after 7500 years.
c. Can you use your model to predict when 50 g of the sample will be left? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934139>

Question 183

Every year favorite songs compete to be on a Top 200 list based upon sales and rankings by the experts in the music industry. These songs have many characteristics, such as song length and beats per minute, which vary from category to category in the music industry. A disc jockey wondered if the number of beats per minute in songs classified as dance music were lower than the beats per minute in the songs that are ranked on a Top 200 list from 2001. A random sample of songs from each group was selected and the beats per minute are listed in the chart at the right. Does this sample indicate that songs classified as dance music have lower beats per minute than the songs ranked on a Top 200 list?

Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934242>

Question 184

Listed below are the names of 20 students who are juniors. Use the random numbers listed below to select five of them to be in your sample. Clearly explain your method.

Answer: <https://biology-forums.com/index.php?topic=1934162>

Question 185

A common objective for many school administrators is to increase the number of students taking SAT and ACT tests from their school. The data from each state from 2003 are reflected in the scatterplot below.

- a. Write a few sentences describing the association.
b. Estimate the correlation. $r =$
c. If the point in the top left corner (4, 1215) were removed, would the correlation become stronger, weaker, or remain about the same? Explain briefly.
d. If the point in the very middle (38, 1049) were removed, would the correlation become stronger, weaker, or remain about the same? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1934075>

Question 186

The estimated regression line is the line that minimizes the sum of the squares of the distances from the given points to the line.

Indicate whether the statement is true or false

Indicate whether the statement is true or false

What will be an ideal response?
The owner of a car dealership planned to develop strategies to increase sales. He hoped to learn the reasons why many people who visit his car lot do not eventually buy a car from him.

For one month he asked his sales staff to keep a list of the names and addresses of everyone who came in to test drive a car. At the end of the month he sent surveys to the people who did not buy the car, asking them why. About one third of them returned the survey, with 44 of those indicating that they found a lower price elsewhere. Which is true?

- I. The population of interest is all potential car buyers.
- II. This survey design suffered from non-response bias.
- III. Because it comes from a sample 44 is a parameter, not a statistic.

- A) I only
- B) I and II only
- C) II only
- D) II and III only

E) I, II, and III

A) = 0.3 P(B) = 0.6, and P(A ∩ B) = 0.4. Find P(A ∪ B).

A) 0.5 B) 1.3 C) 0.9 D) 0.4

Each student was asked, Are you planning or not planning to pursue a graduate degree? Of the 1010 surveyed, 658 stated that they were planning to pursue a graduate degree. Construct and interpret a 98 confidence interval for the proportion of college seniors who are planning to pursue a graduate degree.

A) (0.620, 0.682); we are 98 confident that the proportion of college seniors who are planning to pursue a graduate degree is between 0.620 and 0.682.

B) (0.612, 0.690); we are 98 confident that the proportion of college seniors who are planning to pursue a graduate degree is between 0.612 and 0.690.

C) (0.621, 0.680); we are 98 confident that the proportion of college seniors who are planning to pursue a graduate degree is between 0.621 and 0.680.

D) (0.616, 0.686); we are 98 confident that the proportion of college seniors who are planning to pursue a graduate degree is between 0.616 and 0.686.

When considering area under the standard normal curve, decide whether the area between $z = -1.5$ and $z = -1$ is bigger than, smaller than, or equal to the area between $z = 2$ and $z = 2.5$.

A) bigger than B) smaller than C) equal to

Indicate whether the statement is true or false

Answer: <https://biology-forums.com/index.php?topic=1698157>

Question 187

All students in a physical education class completed a basketball free-throw shooting event and the highest number of shots made was 32. The next day a student who had just transferred into the school completed the event, making 35 shots. Indicate whether adding the new student's score to the rest of the data made each of these summary statistics increase, decrease, or stay about the same.

- a. mean
- b. median
- c. range
- d. IQR
- e. standard deviation

Answer: <https://biology-forums.com/index.php?topic=1934055>

Question 188

An event is considered unusual if the probability of observing the event is

A) less than 0.025 B) less than 0.10 C) greater than 0.95 D) less than 0.05

Decide whether the experiment is a binomial experiment. If it is not, explain why. Each week, a man attends a club meeting in which he has a 10 chance of meeting a new member. The random variable is the number of times he meets a new member in 82 weeks.

A) published source B) observational study

C) designed experiment D) survey

Which of the following is not a characteristic of Students' t-distribution?

- A) depends on degrees of freedom.
B) symmetric distribution
C) For large samples, the t and z distributions are nearly equivalent.
D) mean of 1
- Video games A headline in a local newspaper announced Video game playing can lead to better spatial reasoning abilities.

The article reported that a study found statistically significant differences between teens who play video games and teens who do not, with teens who play video games testing better in spatial reasoning. Do you think the headline was appropriate? Explain.

Decide whether the experiment is a binomial experiment. If it is not, explain why. Survey 500 college students see whether they are enrolled as a new student. The random variable represents the number of students enrolled as new students.

What will be an ideal response?
Determine whether or not the following events are mutually exclusive. Four coins are tossed: one tail is observed, at least one tail is observed.

A) cannot be determined B) not mutually exclusive C) mutually exclusive
The business college computing center wants to determine the proportion of business students who have personal computers (PC's) at home. If the proportion exceeds 30, then the lab will scale back a proposed enlargement of its facilities.

Suppose 200 business students were randomly sampled and 75 have PC's at home. What assumptions are necessary for this test to be satisfied?

- A) The sample variance equals the population variance.
B) The sample mean equals the population mean.
C) The population has an approximately normal distribution.
D) No assumptions are necessary.

Answer: <https://biology-forums.com/index.php?topic=1698188>

Question 189

A frequency polygon is a line graph of a cumulative frequency distribution.

Indicate whether the statement is true or false
When considering area under the standard normal curve, decide whether the area to the left of $z = -2.5$ is bigger than, smaller than, or equal to the area to the right of $z = 2$.

A) smaller than B) bigger than C) equal to
When calculating the mathematical expectation, amounts which represent losses are assigned _____ values.

Fill in the blank(s) with correct word
Assume that $P(C) = 0.5$ and $P(D) = 0.3$. If C and D are independent, find $P(C \text{ and } D)$.

A) 0.3 B) 0.5 C) 0.15 D) 1.5
The means of many samples drawn from the same population usually do not fluctuate widely.

Indicate whether the statement is true or false
If the difficulty level of books is ranked from 1 to 10, a set of data rankings of books falls into the category of _____

data.

Fill in the blank(s) with correct word
If we wish to compare the average PSAT scores of boys and girls taking Statistics at a high school, which would be the best way to gather these data?

- A) SRS
B) census
C) stratified sample
D) observational study
E) experiment
It is possible for the class boundaries of an interval to be the same as its class limits.

Indicate whether the statement is true or false

Answer: <https://biology-forums.com/index.php?topic=1698163>

Question 190

Home ownership According to the Bureau of the Census, 68.0% of Americans owned their own homes in 2003. A local real estate office is curious as to whether a higher percentage of Americans own their own homes in its area. The office selects a random sample of 200 people in the area to estimate the percentage of those people that own their own homes.

- Verify that a Normal model is a useful approximation for the Binomial in this situation.
- What is the probability that at least 140 people will report owning their own home?
- Based on the sample, how many people would it take for you to be convinced that a higher percentage of Americans own their own homes in that area? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934172>

Question 191

Auto repairs An insurance company hopes to save money on repairs to autos involved in accidents. Two body shops in town seem to do most of the repairs, and the company wonders whether one of them is generally cheaper than the other. From their files of payments made during the past year they select a random sample of ten bills they paid at each repair shop. The data are shown in the table.

Indicate what inference procedure you would use to see if there is a significant difference in the costs of repairs done at these two body shops, then decide if it is okay to actually perform that inference procedure. (Check the appropriate assumptions and conditions and indicate whether you could or could not proceed. You do not have to do the actual test.)

Answer: <https://biology-forums.com/index.php?topic=1934506>

Question 192

At an antique boat show, 90% of the boats are made of a natural, polished wood. 75% of the boats have some chrome accents on the boat on at least one visible feature. And 60% have both features.

Does it appear that having chrome accents and being made of wood are independent characteristics? Provide statistical evidence to justify your response.

Answer: <https://biology-forums.com/index.php?topic=1934407>

Question 193

Distributions having a tail to the right are called negative skewed.

Indicate whether the statement is true or false
Q. 2 If an interviewer asks the question Do you approve of the Presidents big spending policy?, he is making the error of _____ .

Fill in the blank(s) with correct word
Q. 3 When applying the _____ criterion, we look for the largest value of each column of the payoff table and select the largest of these column values.

Fill in the blank(s) with correct word
Q. 4 The probability of an event A, given B has occurred is denoted by the symbol

A) $P(BA)$ B) $P(A \text{ and } B)$ C) $P(A \text{ or } B)$ D) $P(AB)$
Q. 5 The only objective of statistics is to describe data sets (populations or samples).

Indicate whether the statement is true or false
Q. 6 Property taxes Administrators of the fire department are concerned about the possibility of implementing a new property tax to raise moneys needed to replace old equipment.

They decide to check on public opinion by having a random sample of the city's population.

a. Several plans for choosing the sample are proposed. Write the letter corresponding to the sampling strategy in the blank next to each plan.
A. convenience; B. stratified; C. simple; D. cluster; E. systematic

____i. The city has five property classifications: single family homes, apartments, condominiums, temporary housing (hotel and campgrounds), and retail property. Randomly select ten residents from each category.

____ii. Each property owner has a 5-digit ID number. Use a random number table to choose forty numbers.

____iii. At the start of each week, survey every tenth person who arrives at the city park.

____iv. Randomly select a housing classification (say, apartments) and survey all the people who live in that property classification.

____v. Have each firefighter survey 10 of his/her neighbors.

b. Briefly explain why plan iv suggested above, sampling an entire housing classification, might be biased. Be sure to name the kind(s) of bias you describe.

c. Name and briefly describe the kind of bias that might be present if the administration decides that instead of subjecting people to a random sample they'll just

i. interview people about the new property tax at a fire station open house.

ii. ask people who are willing to be taxed to sign a petition.

Fill in the blank(s) with correct word. Q. 7/An ogive of a cumulative less than distribution always decreases as we move from left to right.

Indicate whether the statement is true or false. Q. 8/ A service station receives an average of six customers per hour. The probability that there will be three arrivals in a given hour can be found by using the

- A) binomial distribution. B) Poisson distribution.
- C) hypergeometric distribution. D) multinomial distribution.

Answer: <https://biology-forums.com/index.php?topic=1698168>

Question 194

A study of 2700 college students in the city of Pemblington found that 14 had been victims of violent crimes.

A) statistic B) parameter. Q. 2/ 29.2 of the mayors of cities in a certain state are from minority groups.

A) parameter B) statistic. Q. 3/ In a survey conducted in the town of Atherton, 28 of adult respondents reported that they had been involved in at least one car accident in the past ten years.

A) statistic B) parameter. Q. 4/ A farmer wishes to test the effects of a new fertilizer on her corn yield. She has four equal-sized plots of land-- one with sandy soil, one with rocky soil, one with clay-rich soil, and one with average soil.

She divides each of the four plots into three equal-sized portions and randomly labels them A, B, and C. The four A portions of land are treated with her old fertilizer. The four B portions are treated with the new fertilizer, and the four C's are treated with no fertilizer. At harvest time, the corn yield is recorded for each section of land. What is the response variable in this experiment? A) the corn yield recorded for each section of land B) the type of fertilizer (old, new, or none)

C) the section of land (A, B, or C) D) the four types of soil. Q. 5/ Political math A recent study by Yale professors found that people's ability to do mathematics computations got worse when the result went against the person's political ideology.

This was based on a randomized experiment in which people were given the same basic computation, but some were given the question in a politically neutral context and others were given the same computation in a context in which the correct answer went against their political ideology. The difference between the proportion of people who got the question wrong in a neutral' context and those who got the question wrong in a political' context was reported to be statistically significant.

- a. Briefly explain what statistically significant means in this context.
- b. Would it be appropriate for the news media to report that the political context caused the poor computational results?

Explain. Q. 6/ Gun control Two friends who strongly disagree on whether there should be stricter regulation of guns in this country want to conduct a poll of the students in their school to see which side most students agree with.

Each came back with a different version of the question they want to ask.

Version 1: Do you think the government should respect our 2nd Amendment rights and allow lawabiding citizens to own guns?

Version 2: In the wake of recent mass shootings, should laws be passed to keep guns out of the hands of people with a history of violence?

- a. Which version would make it seem like people oppose stricter gun regulation? What kind of bias is this?
- b. Is the version you did not pick in part a less biased?
- c. Is it reasonable for a person to respond 'yes' to both questions?

Q. 7/ Survey. A local news station wants to know what percentage of people favor investing in new public light-rail system for the city. They conduct a survey, calling homes between 10:00 a.m. and 3:00 p.m. Explain why this sampling plan is biased.

What will be an ideal response? Q. 8/ Announcements. A high school in Wisconsin stopped having announcements read to students over the intercom system, choosing to have announcements displayed on television monitors located throughout the building.

To see how students feel about the new system the principal wants to conduct a survey. Explain how to select a sample of about 500 students using each sampling method below:

- a. Simple random sample
- b. Stratified random sample with grade levels as strata
- c. Cluster sample with classrooms as clusters

Answer: <https://biology-forums.com/index.php?topic=1698024>

Question 195

The following is a scatterplot of the average final exam score versus midterm score for 11 sections of an introductory statistics class:

The correlation coefficient for these data is $r = 0.829$. If you had a scatterplot of the final exam score versus midterm score for all individual students in this introductory statistics course, would the correlation coefficient be weaker, stronger, or about the same? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934357>

Question 196

One common method of evaluating the performance of a mutual fund is to compare its returns to those of a recognized benchmark such as an index of the returns on all securities of the type that the fund accumulates. The Janus Worldwide Fund considers its benchmark to be the MSCI World IndexSM. The table below depicts the annual returns (percent) for a recent ten-year period. Is this fund a good investment? That is, does this fund significantly outperform its benchmark?

Source:

[https://ww3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20\(Janus%20Worldwide%20Fund-Class%20A\)_exp%2004-15-13.pdf](https://ww3.janus.com/advisor/Documents/Advisor%20Lit%20System/Fact%20Sheets/4Q12%20Fact%20Sheet%20(Janus%20Worldwide%20Fund-Class%20A)_exp%2004-15-13.pdf)

Explain clearly whether this data should be analyzed using a 2-sample t test approach or a match pairs t-test method.

Answer: <https://biology-forums.com/index.php?topic=1934502>

Question 197

Shrimp From 1982 to 1990, there was a decrease in the number of white shrimp harvested from the Galveston Bay. Here is the regression analysis and a residual plot. The year has been shortened to two digits (82, 83.....) and the dependent variable is the number of shrimp collected per hour.

- Write the regression equation and define your variables.
- Find the correlation coefficient and interpret it in context.
- Interpret the value of the slope in context.
- In 1991, the shrimp production rebounded (in part due to the effects of El Nino) to 81 shrimp/hour. Find the value of this residual.
- The prediction for 1991 was very inaccurate. What name do statisticians give to this kind of prediction error?

Answer: <https://biology-forums.com/index.php?topic=1934378>

Question 198

A plot of the residuals versus the fitted values for record-breaking times of female marathon runners for the years 1998 – 2003 is:

Based on this residuals plot, does it seem reasonable to use linear regression for this model? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934358>

Question 199

Gun ownership Concerned about recent incidence of gun violence, a public interest group conducts a poll of 850 randomly selected American adults and finds that 44% of those surveyed have a gun in their home.

- Construct and interpret a 95% confidence interval for the proportion of all American adults who have a gun in their home.
- Explain what is meant by 95% confidence in this context.

Answer: <https://biology-forums.com/index.php?topic=1934226>

Question 200

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.

Do you think a linear model is appropriate here? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934120>

Question 201

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation - bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

Find each percent.

- What percent of the students are girls who ride the bus?
- What percent of the girls ride the bus?
- What percent of the bus riders are girls?

Answer: <https://biology-forums.com/index.php?topic=1934053>

Question 202

Before you took this course, you probably heard many stories about Statistics courses. Oftentimes parents of students have had bad experiences with Statistics courses and pass on their anxieties to their children. To test whether actually taking AP* Statistics decreases students' anxieties about statistics, an AP* statistics instructor gave a test to rate student anxiety at the beginning and end of his course. Anxiety levels were measured on a

scale of 0-10. Here are the data for 16 randomly chosen students from a class of 180 students:

Create and interpret a 90% confidence interval.

Answer: <https://biology-forums.com/index.php?topic=1934249>

Question 203

Suppose the number of babies born each hour at a hospital follows a Poisson distribution with a mean of 3. Some people believe that the presence of a full moon increases the number of births that take place.

Suppose during the presence of a full moon, the hospital experienced eight consecutive hours with more than four births each hour. Based on this fact, comment on the belief that the full moon increases the number of births.

A) The belief is supported as the probability of observing this many births would be 0.00000137.

B) The belief is not supported as the probability of observing this many births is 0.185.

C) The belief is not supported as the probability of observing this many births is 0.00000137.

D) The belief is supported as the probability of observing this many births would be 0.185.

In a completely randomized design experiment, 10 experimental units were randomly chosen for each of three treatment groups and a quantity was measured for each unit within each group.

In the first steps of testing whether the means of the three groups are the same, the sum of squares for treatments was calculated to be 3,110 and the sum of squares for error was calculated to be 27,000.

Complete the ANOVA table.

Source	df	SS	MS	F
Treatments				
Error				
Total				

If a data set is normally distributed, what is the proportion of measurements you would expect to fall within

A) 100 B) 95 C) 68 D) 50

Name and describe the kind of bias that might be present if the statistics teacher decides that instead of randomly selecting students to survey on how they feel about the course she just

a. asks students to volunteer for the survey.

b. gives the survey during class one day.

Management at a large retail chain is concerned about the possibility of drug abuse by people who work there. They decide to check on the extent of the problem by having a random sample of the employees undergo a drug test. Several plans for choosing the sample are proposed.

a. Randomly select ten stores around the country and survey all the employees that work at those stores.

b. Choose the fourth person that arrives to work for each shift.

c. There are four employee classifications: supervisors, fulltime clerks, part-time clerks, and maintenance staff. Randomly select ten people from each category.

d. Each employee has a three-digit identification number. Randomly choose 40 numbers.

Suppose the number of babies born each hour at a hospital follows a Poisson distribution with a mean of 7. Find the probability that exactly six babies will be born during a particular 1-hour period at this hospital.

A) 0.000005 B) 0.000260 C) 0.149003 D) 0.018625

If the teacher in simply surveyed all of her students, what kind of sampling would that be? Explain why this method is biased. Be sure to name the kind(s) of bias you describe and link it to the variable of interest.

What type of car is more popular among college students, American or foreign? One hundred fifty-nine college students were randomly sampled and each was asked which type of car he or she prefers.

A computer package was used to generate the printout below for the proportion of college students who prefer American automobiles.

SAMPLE PROPORTION = .390998

SAMPLE SIZE = 159

UPPER LIMIT = .464240

LOWER LIMIT = .331153

What proportion of the sampled students prefer foreign automobiles?

A) .464240 B) .390998 C) .331153 D) .609002

Complete the ANOVA table.

Source df SS MS F
Treatments 3 857.1
Error 8 372.8
Total

What will be an ideal response?

Answer: <https://biology-forums.com/index.php?topic=1698046>

Question 204

Tax advice Each year people who have income file income tax reports with the government. In some instances people seek advice from accountants and financial advisors regarding their income tax situations. This advice is meant to lower the percentage of taxes paid to the government each year. A random sample of people who filed tax reports resulted in the data in the table below. Does this data indicate that people should seek tax advice from an accountant or financial advisor? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934204>

Question 205

Gun control Two friends who strongly disagree on whether there should be stricter regulation of guns in this country want to conduct a poll of the students in their school to see which side most students agree with. Each came back with a different version of the question they want to ask.

Version 1: Do you think the government should respect our 2nd Amendment rights and allow lawabiding citizens to own guns?

Version 2: In the wake of recent mass shootings, should laws be passed to keep guns out of the hands of people with a history of violence?

- Which version would make it seem like people oppose stricter gun regulation? What kind of bias is this?
- Is the version you did not pick in part a less biased?
- Is it reasonable for a person to respond 'yes' to both questions?

Answer: <https://biology-forums.com/index.php?topic=1934168>

Question 206

Which of the following is not one of the multiple comparison method options available to compare treatment means?

- A) The Scheffe Method B) The Tukey Method
C) The Bonferroni Method D) The Einstein Method
- Q. 2 Name and describe the kind of bias that might be present if the administration decides that instead of subjecting people to random testing they'll just

- interview employees about possible drug abuse.
- ask people to volunteer to be tested.

A tree farmer hires a botanist to evaluate a blight that seems to be affecting his trees. The trees are planted in horizontal rows on a hill and the blight seems to be a bigger problem near the bottom of the hill. The farmer wants to know the extent of the damage to the trees. Since the trees must be destroyed to examine them, the botanist doesn't have time to examine all the trees, so she will select a sample. Several plans for choosing the sample are proposed.

- Randomly select three trees from each horizontal row.
- Lay out a grid on a map of the hill. Randomly select eight squares from the grid, and check all trees in those squares.
- Randomly pick a number from 1 to 30. Start at the tree at that position in the first row, then go to every 30th tree after that.
- Check the ten trees closest to the parking lot where the botanist parks her car.

Q. 3 A certain baseball player hits a home run in 7 of his at-bats. Consider his at-bats as independent events. Find the probability that this baseball player hits more than 42 home runs in 800 at-bats?

- A) 0.0307 B) 0.07 C) 0.93 D) 0.9693
- Q. 4 Which method generally produces wider confidence intervals?

A) Tukey B) Bonferroni C) ANOVA D) Scheff

Q. 5 One administrator suggested walking into the break room and testing the people in there. What type of sampling would this be? Explain why this method is biased. Be sure to name the kind(s) of bias you describe and link it to the variable of interest.

What will be an ideal response?

Q. 6 Transportation officials tell us that 80 of drivers wear seat belts while driving. What is the probability that between 656 and 665 drivers in a sample of 850 drivers wear seat belts?

A) 0.8925 B) 0.0179 C) 0.0896 D) 0.1075

Q. 7 An alarm company reports that the number of alarms sent to their monitoring center from customers owning their system follow a Poisson distribution with $\lambda = 4.6$ alarms per year.

Find the probability that a randomly selected customer had more than 7 alarms reported.

A) 0.087 B) 0.905 C) 0.818 D) 0.095 E) 0.182

Q. 8 Which procedure was specifically developed for pairwise comparisons when the sample sizes of the treatments are equal?

A) ANOVA B) Bonferroni C) Scheff D) Tukey

Answer: <https://biology-forums.com/index.php?topic=1698043>

Question 207

How do sports salaries compare? Two sets of histograms below show the distributions of salaries for Major League Baseball and the National Football League. Give two reasons why the second set of histograms makes it easier to compare the distributions. Then write a few sentences comparing the salary distributions for the two sports.

Answer: <https://biology-forums.com/index.php?topic=1934065>

Question 208

Growth A scientist is running an experiment that involves waiting for a culture to grow. The average time for one experiment to run is 93 minutes with a standard deviation of 10 minutes.

- If the scientist is going to run five experiments, with a 7 minute set-up time in between each experiment, what is the average of the total time this will take?
- What is the standard deviation of the total time?
- What assumption did you need make the calculations in the previous two problems?

Answer: <https://biology-forums.com/index.php?topic=1934457>

Question 209

A study by a prominent psychologist found a moderately strong positive association between the number of hours of sleep a person gets and the person's ability to memorize information.

- Explain in the context of this problem what "positive association" means.
- Hoping to improve academic performance, the psychologist recommended the school board allow students to take a nap prior to any assessment. Discuss the psychologist's recommendations.

Answer: <https://biology-forums.com/index.php?topic=1934074>

Question 210

The boxplots show the age of people involved in accidents according to their role in the accident.

- Which role involved the youngest person, and what is the age?
- Which role had the lowest median age, and what is the age?
- Which role had smallest range of ages, and what is it?
- Which role had the largest IQR of ages, and what is it?
- Which role generally involved the oldest people? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934321>

Question 211

The midrange is a measure of variation.

Indicate whether the statement is true or false. In order to make a decision using the minimax criterion, we select the action that gives the _____ of the _____ opportunity losses.

Fill in the blank(s) with correct word. If two events A and B are _____, then $P(A \text{ and } B) = P(A)P(B)$.

A) P(B).

A) independent B) mutually exclusive C) simple events D) complements

A) the area of the rejection region for the null hypothesis.

B) the probability of a Type II error.

C) whether the test is one-tailed or two-tailed.

D) the probability of accepting the null hypothesis. Sampling with replacement from a finite population is, in effect, sampling from an infinite population.

Indicate whether the statement is true or false. Grape juice and blood pressure Researchers who wanted to see if drinking grape juice could help people lower their blood pressure got 120 non-smokers to volunteer for a study.

They measured each person's blood pressure and then randomly divided the subjects into two groups. One group drank a glass of grape juice every day while the other did not. After sixty days the researchers measured everyone's blood pressure again. They reported that differences in changes in

blood pressure between the groups were not statistically significant.

- Was this an experiment or an observational study? Explain briefly.
- Briefly explain what not statistically significant means in this context.
- Briefly explain why the researchers randomly assigned the subjects to the groups.
- Since everyone's blood pressure was measured at the beginning and at the end of the study, the researchers could have simply looked at the grape juice drinkers to see if their blood pressure changed. Briefly explain why the researchers bothered to include the control group.
- Briefly explain why the researchers studied only non-smokers.
- Other researchers now plan to replicate this study using both smokers and non-smokers. Briefly describe the design strategy you think they should use.

Indicate whether the statement is true or false

Answer: <https://biology-forums.com/index.php?topic=1698165>

Question 212

Test identification Suppose you were asked to analyze each of the situations described below. (NOTE: Do not do these problems!) For each, indicate which procedure you would use (pick the appropriate number from the list), the test statistic (z or t), and, if t, the number of degrees of freedom.

- Among randomly selected pets, 27% of the 188 dogs and 18% of the 167 cats had fleas. Does this indicate a significant difference in rates of flea problems for these two pets?
- Are there more broken bones in summer or winter? We get records about the number of fractures treated in January and July at a random sample of 25 emergency rooms.
- A random sample of 600 high school seniors reported their grade point averages and the amount of financial aid offered them by colleges. We wonder if there is an association between academic success and college aid.
- The school newspaper wants a 95% confidence interval for the road test failure rate. In a random sample of 65 student drivers, 37 said they failed their driver's test at least once.
- A supermarket chain wants to know which of two merchandise display methods is more effective. They randomly assign 15 stores to use display type A and 15 others to use display type B, then collect data about the number of items sold at each store.
- Tags placed on garbage cans allow the disposal of up to 30 pounds of garbage. A random sample of 22 cans averaged 33.2 pounds with a standard deviation of 3.2 pounds. Is this strong evidence that residents overload their garbage cans?

Answer: <https://biology-forums.com/index.php?topic=1934503>

Question 213

Approval rating A newspaper article reported that a poll based on a sample of 1150 residents of a state showed that the state's Governor's job approval rating stood at 58%. They claimed a margin of error of $\pm 3\%$. What level of confidence were the pollsters using?

Answer: <https://biology-forums.com/index.php?topic=1934200>

Question 214

Cool Off A survey of southern California houses in a given town shows that 70% of the homes have an air conditioning system and 90% of home have at least one ceiling fan. 65% of all homes surveyed had both features.

- What is the probability that a randomly selected home neither feature?
- What is the probability that a randomly selected home has a ceiling fan, given that it already has an air conditioning system?
- Do these two house features appear to be independent? Justify your answer.

Answer: <https://biology-forums.com/index.php?topic=1934456>

Question 215

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation - bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

Identify the variables and tell whether each is categorical or quantitative.

Answer: <https://biology-forums.com/index.php?topic=1934051>

Question 216

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.

Explain the meaning of R^2 in the context of this problem.

Answer: <https://biology-forums.com/index.php?topic=1934122>

Question 217

Carnivores A random sample of some of the heaviest carnivores on Earth was reviewed to determine if there is an association between the length (in meters) and weight (in kilograms) of these carnivores. Here are the scatterplot, the residuals plot, a histogram of the residuals, and the regression analysis of the data. Use this information to analyze the association between the length and weight of these carnivores.

- Is there an association? Write appropriate hypotheses.
- Are the assumptions for regression satisfied? Explain.
- What do you conclude?
- Create a 98% confidence interval for the true slope.
- Explain in context what your interval means.

Answer: <https://biology-forums.com/index.php?topic=1934291>

Question 218

Insurance companies track life expectancy information to assist in determining the cost of life insurance policies. The insurance company knows that, last year, the life expectancy of its policyholders was 77 years. They want to know if their clients this year have a longer life expectancy, on average, so the company randomly samples some of the recently paid policies to see if the mean life expectancy of policyholders has increased. The insurance company will only change their premium structure if there is evidence that people who buy their policies are living longer than before.

Does this sample indicate that the insurance company should change its premiums because life expectancy has increased? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934233>

Question 219

Variables X and Y have $r = 0.40$. If we decrease each X value by 0.1, double each Y value, and then interchange them (put X on the Y-axis and vice versa) the new correlation will be

A) 0.15 B) 0.60 C) -0.40 D) 0.40 E) 0.80

Q. 2 For families who live in apartments the correlation between the family's income and the amount of rent they pay is $r = 0.60$. Which is true?

- In general, families with higher incomes pay more in rent.
- On average, families spend 60% of their income on rent.
- The regression line passes through 60% of the (income, rent) data points.

A) I, II, and III B) I only C) I and III only D) I and II only E) II only

Q. 3 A lakeside restaurant found the correlation between the daily temperature and the number of meals they served to be 0.40.

On a day when the temperature is two standard deviations above the mean, the number of meals they should plan on serving is ___ the mean.

- 0.16 SD above
- equal to
- 0.8 SD above
- 2.0 SD above
- 0.4 SD above

Q. 4 It takes a while for new factory workers to master a complex assembly process. During the first month new employees work,

the company tracks the number of days they have been on the job and the length of time it takes them to complete an assembly. The correlation is most likely to be

A) exactly -1.0 B) exactly +1.0 C) near +0.6 D) near 0 E) near -0.6

Q. 5 Music and grades (True Story) A couple of years ago, a local newspaper published research results claiming a positive association between the number of years high school children had taken instrumental music lessons

and their performances in school (GPA).

a. What does positive association mean in this context?

b. A group of parents then went to the School Board demanding more funding for music programs as a way to improve student chances for academic success in high school. As a statistician, do you agree or disagree with their reasoning? Explain briefly.

Q. 6 Education research consistently shows that students from wealthier families tend to have higher SAT scores.

The slope of the line that predicts SAT score from family income is 6.25 points per 1000, and the correlation between the variables is 0.48. Then the

slope of the line that predicts family income from SAT score (in 1000 per point)

A) is 6.25 B) is 0.037 C) is 3.00 D) is 13.02 E) is 0.16
Q. 7 A medical researcher finds that the more overweight a person is, the higher his pulse rate tends to be. In fact, the model suggests that 12-pound differences in weight are associated with differences in pulse rate of 4 beats per minute.

Which is true?

- I. The correlation between pulse rate and weight is 0.33
- II. If you lose 6 pounds, your pulse rate will slow down 2 beats per minute.
- III. A positive residual means a person's pulse rate is higher than the model predicts.

- A) none
- B) I only
- C) II and III only
- D) III only

E) II only
Q. 8 The correlation between a family's weekly income and the amount they spend on restaurant meals is found to be $r = 0.30$. Which must be true?

- I. Families tend to spend about 30 of their incomes in restaurants.
- II. In general, the higher the income, the more the family spends in restaurants.
- III. The line of best fit passes through 30 of the (income, restaurant) data points.

- A) II only
- B) II and III only
- C) I only
- D) III only
- E) I, II, and III

Answer: <https://biology-forums.com/index.php?topic=1698338>

Question 220

As a 4-H project, Billy is raising chickens. He feeds and waters them every day, and collects the eggs every other day, selling them to people in the neighborhood. He has found that each hen's nest will contain from 0 to 2 eggs. Based on past experience he estimates that there will be no eggs in 10% of the nests, one egg in 30% of the nests, and 2 eggs in the other 60%. Conduct a simulation to estimate how many nests Bill will have to visit to collect a dozen eggs.

Describe how you will use a random number table to conduct this simulation.

Answer: <https://biology-forums.com/index.php?topic=1934154>

Question 221

A young boy is fishing off the end of a dock. He estimates that for one out of every 15 times he casts his line, he gets at least a nibble from a curious fish. He is going to cast his line 50 times before he switches to toad hunting.

If he gets only 5 nibbles on his line, is that a signal that he is having less success than usual? Justify your answer.

Answer: <https://biology-forums.com/index.php?topic=1934430>

Question 222

Textbook authors must be careful that the reading level of their book is appropriate for the target audience. Some methods of assessing reading level require estimating the average word length. We've randomly chosen 20 words from a randomly selected page in Stats: Modeling the World and counted the number of letters in each word: 5, 5, 2, 11, 1, 5, 3, 8, 5, 4, 7, 2, 9, 4, 8, 10, 4, 5, 6, 6

Suppose that our editor was hoping that the book would have a mean word length of 6.5 letters. Does this sample indicate that the authors failed to meet this goal? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934235>

Question 223

In a random sample of 26 laptop computers, the mean repair cost was 151 with a standard deviation of 35. Assume the population has a normal distribution. Construct a 95 confidence interval for the population mean, .

Suppose you did some research on repair costs for laptop computers and found that the standard deviation is . Use the normal distribution to construct a 95 confidence interval for the population mean, . Compare the results. Round to the nearest cent.

To calculate the probability of obtaining three aces in eight draws of a card without replacement, the required distribution is the

- A) hypergeometric distribution. B) Poisson distribution.
 - C) binomial distribution. D) multinomial distribution.
- Q. 3 Which of the following symbols represents a sample value, not a population value?

A) B) x C) D) N
Q. 4 The amount of soda a dispensing machine pours into a 12 ounce can of soda follows a normal distribution with a standard deviation of 0.08 ounce.

Every can that has more than 12.20 ounces of soda poured into it causes a spill and the can needs to go through a special cleaning process before it can be sold. What is the mean amount of soda the machine should dispense if the company wants to limit the percentage that need to be cleaned because of spillage to 3?

A) 12.3736 oz B) 12.3504 oz C) 12.0264 oz D) 12.0496 oz
Q. 5 Insulators Ceramics engineers are testing a new formulation for the material used to make insulators for power lines.

They will try baking the insulators at four different temperatures, followed by either slow or rapid cooling. They want to try every combination of the baking and cooling options to see which produces insulators least likely to break during adverse weather conditions.

- What are the experimental units?
- How many factors are there?
- How many treatments are there?
- What is the response variable?

Q. 6 Given the frequency distribution:

Scores Frequency

20-29 8

30-59 18

For the histogram of this distribution, the height of the 30-59 interval should be _____.

A) 18 B) 9 C) 54 D) 6
Q. 7 _____ refers to inaccuracies in the values of the data recorded.

A) Selection bias B) Sampling error
C) Measurement error D) A frame
Q. 8 For the data 2, 10, 20, 15, 100, 30, and 90, which of the following measures would be changed if the 90 were changed to 70?

A) the mean B) the median C) the mode D) the midrange
Q. 9 To calculate the probability of obtaining three aces in eight draws of a card with replacement from an ordinary deck, we would use the

- hypergeometric distribution.
- Poisson distribution.
- binomial distribution.
- multinomial distribution.

Answer: <https://biology-forums.com/index.php?topic=1698174>

Question 224

Time Wasted A group of students decide to see if there is link between wasting time on the internet and GPA. They don't expect to find an extremely strong association, but they're hoping for at least a weak relationship. Here are the findings.

a. How strong is the relationship the students found? Describe in context with statistical justification.

One student is concerned that the relationship is so weak, there may not actually be any relationship at all. To test this concern, he runs a simulation where the 10 GPA's are randomly matched with the 10 hours/week. After each random assignment, the correlation is calculated. This process is repeated 100 times. Here is a histogram of the 100 correlations. The correlation coefficient of -0.371 is indicated with a vertical line.

b. Do the results of this simulation confirm the suspicion that there may not be any relationship? Refer specifically to the graph in your explanation.

Answer: <https://biology-forums.com/index.php?topic=1934109>

Question 225

The five-number summary for the weights (in pounds) of fish caught in a bass tournament is:

- Would you expect the mean weight of all fish caught to be higher or lower than the median? Explain.
- You caught 3 bass weighing 2.3 pounds, 3.9 pounds, and 4.2 pounds. Were any of your fish outliers? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934060>

Question 226

According to the Centers for Disease Control, about 36% of U.S. adults were obese in 2013. To see if that has changed since the last study, a random sample of 250 U.S. adults will be checked.

- Describe the sampling distribution model for the sample proportion (assuming no change in obesity rates) by naming the model and telling its mean and standard deviation. Justify your answer.
- Sketch and clearly label the model.
- What is the probability that in this group less than 25% of the adults will be found to be obese?

Answer: <https://biology-forums.com/index.php?topic=1934467>

Question 227

Depression A recent psychiatric study from the University of Southampton observed a higher incidence of depression among women whose birth weight was less than 6.6 pounds than in women whose birth weight was over 6.6 pounds. Based on a P-value of 0.0248 the researchers concluded there was evidence that low birth weights may be a risk factor for susceptibility to depression. Explain in context what the reported P-value means.
Answer: <https://biology-forums.com/index.php?topic=1934202>

Question 228

A professor at a large university believes that students take an average of 15 credit hours per term. A random sample of 24 students in her class of 250 students reported the following number of credit hours that they were taking:

Does this sample indicate that students are taking more credit hours than the professor believes? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934231>

Question 229

Car reliability A consumer group assigned 62 car models reliability ratings of 1 - 5 based upon repair records. They wondered if more expensive cars might be more reliable. To find out, they created the regression analysis shown. (SHOW WORK. Don't bother writing hypotheses, and you may assume the assumptions for inference were all satisfied.)

a. $df = \underline{\hspace{2cm}}$, $t = \underline{\hspace{2cm}}$, $P = \underline{\hspace{2cm}}$ b. State your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934281>

Question 230

Jacob has a bag of his favorite marbles. It has 3 red marbles, 4 blue and 10 of his most favorite color, neon orange.

If Jacob removes 3 marbles from the bag, what are the chances that he will get at least one orange?

Answer: <https://biology-forums.com/index.php?topic=1934404>

Question 231

A young boy is fishing off the end of a dock. He estimates that for one out of every 15 times he casts his line, he gets at least a nibble from a curious fish. He is going to cast his line 50 times before he switches to toad hunting.

What are the mean and standard deviation of the number of successes he will have out of the 50 attempts?

Answer: <https://biology-forums.com/index.php?topic=1934428>

Question 232

Baseball coaches use a radar gun to measure the speed of pitcher's fastball. They also record outcomes such as hits and strikeouts. The scatterplot below shows the relationship between the average speed of a fastball and the average number of strikeouts per nine innings for each pitcher on the Bulldogs, based on the past season.

Comment on any unusual data point or points in the data set. Explain.

Answer: <https://biology-forums.com/index.php?topic=1934364>

Question 233

Height and weight Last fall, as our first example of correlation, we looked at the heights and weights of some AP* Statistics students. Here are the scatterplot, the residuals plot, a histogram of the residuals, and the regression analysis for the data we collected from the males. Use this information to analyze the association between heights and weights of teenage boys.

a. Is there an association? Write appropriate hypotheses.

b. Are the assumptions for regression satisfied? Explain.

c. What do you conclude?

d. Create a 95% confidence interval for the true slope.

e. Explain in context what your interval means.

Answer: <https://biology-forums.com/index.php?topic=1934283>

Question 234

A San Jose State student collects data from 20 students. He compares the number of classes a student is enrolled in to their GPA. Here are the results of the regression analysis. The conditions for inference are satisfied.

What is the correlation coefficient for this relationship? Interpret this result in context.

Answer: <https://biology-forums.com/index.php?topic=1934278>

Question 235

The five-number summary for the fuel economy (in miles per gallon) of year 2011 midsize cars is:

- Would you expect the mean gas mileage of all midsize cars to be higher or lower than the median? Explain.
- One model of Volkswagen gets 34 mpg, one model of Toyota gets 28 mpg, and one model of Bentley gets 13 mpg. Are any of these cars outliers? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934063>

Question 236

Mistakes. Describe the mistake made in the following analyses:

- Ten teachers compute their average test scores for all their students. Then the superintendent collects their data and finds the school average. He repeats this process for eight different schools and finds a positive correlation between the age of the school average age of the teachers at a school and their average score.
- The mayor of a city is concerned that the population of the city is growing faster than revenue. He calculates that over the last 5 years, the year and the size of the city have a R-sq of 95.7%. With such a high value, the mayor confidently predicts the population for the next three years of fiscal planning.

Answer: <https://biology-forums.com/index.php?topic=1934377>

Question 237

College admissions According to information from a college admissions office, 62% of the students there attended public high schools, 26% attended private high schools, 2% were home schooled, and the remaining students attended schools in other countries. Among this college's Honors Graduates last year there were 47 who came from public schools, 29 from private schools, 4 who had been home schooled, and 4 students from abroad. Is there any evidence that one type of high school might better equip students to attain high academic honors at this college? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934282>

Question 238

Decorate A store sells ornaments for Christmas trees. The prices of the ornaments are roughly normally distributed with a mean of \$7.65 and a standard deviation of \$1.45.

- What is the probability that a randomly selected ornament will cost more than \$10?
- If eight ornaments are randomly selected, what is the probability that exactly 3 of them cost over \$10?

Answer: <https://biology-forums.com/index.php?topic=1934459>

Question 239

The International Olympic Committee states that the female participation in the 2004 Summer Olympic Games was 42%, even with new sports such as weight lifting, hammer throw, and modern pentathlon being added to the Games. Broadcasting and clothing companies want to change their advertising and marketing strategies if the female participation increases at the next games. An independent sports expert arranged for a random sample of pre-Olympic exhibitions. The sports expert reported that 202 of 454 athletes in the random sample were women. Is this strong evidence that the participation rate may increase?

Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934485>

Question 240

The average American sees 3.9 movies at the theater each year. A curious student polls 30 friends and family over the course of a week. He finds that his friends have seen an average of 4.5 movies with a standard deviation of 1.2 movies.

Does this sample provide evidence that people are attending the movies more often? Provide a complete significance test to support your answer.

Answer: <https://biology-forums.com/index.php?topic=1934237>

Question 241

It is important that the sample be representative of the population.

Indicate whether the statement is true or false. Q. 2 Moods A headline in the New York Times announced Research shows running can alter one's moods.

The article reported that researchers gave a Personality Assessment Test to 231 males who run at least 20 miles a week, and found statistically significant personality differences between the runners and the male population as a whole. Do you think the headline was appropriate?

Explain. Q. 3 A simple random sample from a finite population is a sample which is chosen in such a way that each possible

sample has the same probability of being selected.

Indicate whether the statement is true or false. Q. 4. The mean of a list of numbers is more likely to be affected by extreme values than the median.

Indicate whether the statement is true or false. Q. 5. The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60,000 miles and a standard deviation of 1700 miles.

What warranty should the company use if they want 96 of the tires to outlast the warranty?

A) 58,300 mi B) 57,025 mi C) 62,975 mi D) 61,700 mi. Q. 6. The interquartile range is a better measure of variation than:

A) the range. B) the mean deviation.

C) the standard deviation. D) the variance. Q. 7. For ordinal data, we can _____, but for nominal data we cannot.

Fill in the blank(s) with correct word. Q. 8. A die is rolled 10 times. The probability of obtaining from 4 to 7 threes should be determined using the formula for the

A) hypergeometric distribution. B) Poisson distribution.

C) binomial distribution. D) multinomial distribution.

Answer: <https://biology-forums.com/index.php?topic=1698170>

Question 242

A statistics teacher gave her class a 15 point quiz. The summary statistics for the students' scores are shown in the table at the right.

- Notice that the median score and the third quartile are the same. Explain how this can be.
- One student's parent heaped praise on him for scoring 13, saying it was an amazing score. Comment on whether that praise is deserved using the summary statistics as support.
- To convert these raw scores to a score out of 100, the teacher multiplies each score by six, then adds 10. (We can debate the wisdom of such a strategy later!). What is the median converted score? And the IQR?
- What are the mean and standard deviation of the converted test scores?

Answer: <https://biology-forums.com/index.php?topic=1934306>

Question 243

Car colors According to Ward's Communication, 19% of sports car enthusiasts prefer a red color, 16.2% silver, 14.7% black, 14.1% green, 14% white, and 22% other colors. A sample of 250 cars at a NASCAR raceway revealed 45 red cars, 42 silver cars, 34 black cars, 40 green cars, 39 white cars, and 50 other color cars. Are NASCAR color preferences typical of sports car enthusiasts? Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934523>

Question 244

Insulators Ceramics engineers are testing a new formulation for the material used to make insulators for power lines. They will try baking the insulators at four different temperatures, followed by either slow or rapid cooling.

They want to try every combination of the baking and cooling options to see which produces insulators least likely to break during adverse weather conditions.

- What are the experimental units?
- How many factors are there?
- How many treatments are there?

d) What is the response variable? Q. 2. A researcher wants to compare the performance of three types of pain relievers in volunteers suffering from arthritis.

Because people of different ages may suffer arthritis of varying degrees of severity, the subjects are split into two groups: under 60 and over 60. Subjects in each group are randomly assigned to take one of the medications. Twenty minutes later they rate their levels of pain. This experiment

- is completely randomized.
- has two factors, medication and age.
- uses matched pairs.
- has one factor (age) blocked by medication type.

E) has one factor (medication) blocked by age. Q. 3. Does donating blood lower cholesterol levels? 50 volunteers have a cholesterol test, then donate blood, and then have another cholesterol test. Which aspect of experimental design is present?

- randomization
- none of these
- a control group

D) a placebo

E) blinding

A) confounding.

B) variation.

C) randomness.

D) bias.

E) undercoverage.

A) Random selection of subjects.

B) Replication of the on a sufficient number of subjects.

C) Control of known sources of variability.

D) All of these are important.

E) Random assignment of subjects to treatments.

Q. 6/ Hoping to get information that would allow them to negotiate new rates with their advertisers, Natural Health magazine phoned a random sample of 600 subscribers. 64 of those polled said they use nutritional supplements. Which is true?

I. The population of interest is the people who read this magazine.

II. 64 is not a statistic; it's the parameter of interest.

III. This sampling design should provide the company with a reasonably accurate estimate of the percentage of all subscribers who use supplements.

A) I only

B) I, II, and III

C) I and III only

D) II and III only

E) I and II only

Answer: <https://biology-forums.com/index.php?topic=1698028>

Question 245

Do you think the breed selection is independent of gender? Give statistical evidence to support your conclusion.

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used personal transportation bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

	Male	Female	Total
Bus	30	34	64
Ride	37	45	82
Personal	19	23	42
Total	86	102	188

Bus 30 34 64

Ride 37 45 82

Personal 19 23 42

Total 86 102 188

Q. 2/ Write a sentence or two about the conditional relative frequency distribution of the breeds among female respondents.

Q. 3/ What is the marginal distribution of breeds?

Q. 4/ Do you think that milk consumption by young girls is independent of the nationwide survey year? Use statistics to justify your reasoning.

Q. 5/ What is the marginal distribution of milk consumption?

Q. 6/ Find the following:

a. What percent of the young girls reported that they drink milk?

b. What percent of the young girls were in the 1989-1991 survey?

c. What percent of the young girls who reported that they drink milk were in the 1989-1991 survey?

d. What percent of the young girls in 1989-1991 reported they drink milk?

Q. 7/ Describe the W's, if the information is given:

Who:

What:

When:

Where:

How:

Why:

Answer: <https://biology-forums.com/index.php?topic=1698349>

Question 246

Dolphin births A state has two aquariums that have dolphins, with more births recorded at the larger aquarium than at the smaller one. Records indicate that in general babies are equally likely to be male or female, but the gender ratio varies from season to season. Which aquarium is more likely to report a season when over two-thirds of the dolphins born were males? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934199>

Question 247

Vacation days The distribution of the number of vacation days per year offered by different U.S. companies is skewed to the right.

- We collect data on the number of vacation days from a random sample of 60 companies across the United States. Why is it okay to use these data for inference even though the population is skewed?
- The mean and standard deviation of the 60 companies in our sample were 22 days and 9 days, respectively. Specify the sampling model (shape, center, spread) for the mean number of vacation days of such samples.
- Find a 95% confidence interval for the mean number of vacation days offered by U.S. companies.
- Explain what "95% confidence" means in this context.

Answer: <https://biology-forums.com/index.php?topic=1934265>

Question 248

If two consecutive class intervals of a frequency distribution are 60-67 and 68-75, the class boundaries of the second interval are 68.95-75.95.

Indicate whether the statement is true or false
Q. 2 State whether each of the following variables measured on patients at a hospital is quantitative or qualitative.

- previously admitted or not
- age
- type of health insurance

d. days of stay in hospital
Q. 3 Does regular exercise decrease the risk of cancer? A researcher finds 200 women over 50 who exercise regularly, pairs each with a woman who has a similar medical history but does not exercise, then follows subjects for 10 years to see which group

develops more cancer. This is a

- retrospective study
- prospective study
- matched experiment
- survey

E) randomized experiment
Q. 4 The formula for SST in a two-factor experiment is the same as for a complete-block experiment.

Indicate whether the statement is true or false
Q. 5 The value r^2 can assume any value between _____ .

Fill in the blank(s) with correct word
Q. 6 The symbol μ gives the true mean of y for a given value of $x = x_0$.

Indicate whether the statement is true or false
Q. 7 When considering area under the standard normal curve, decide whether the area between $z = -1.5$ and $z = 1.1$

is bigger than, smaller than, or equal to the area between $z = -1.1$ and $z = 1.5$.

- equal to
- bigger than
- smaller than

Answer: <https://biology-forums.com/index.php?topic=1698155>

Question 249

Pew Research found that, in 2013, 50% of American adults favored allowing same-sex couples to marry legally. This is up from 48% in 2012. The 2013 estimate was based on a random sample of 1,501 adults. Assume the same sample size was used in 2012. ["Changing Attitudes on Gay Marriage," Pew Internet and American Life Project, June 2013.]

Compute and interpret a 95% confidence interval for the difference in the proportion of all American adults who favor allowing same-sex couples to marry.

Answer: <https://biology-forums.com/index.php?topic=1934489>

Question 250

A sports analyst was interested in finding out how well a football team's winning percentage (stated as a proportion) can be predicted based upon points scored and points allowed. She selects a random sample of 15 football teams. Each team played 10 games. She decided to use the point differential, points scored minus points allowed as the predictor variable. The data are shown in the table below, and regression output is given afterward.

Is there evidence of an association between Point Differential and Winning Percentage? Test an appropriate hypothesis and state your conclusion in the proper context.

Answer: <https://biology-forums.com/index.php?topic=1934277>

Question 251

For the following conditions, determine if it is appropriate to use the normal distribution to approximate a binomial distribution with $n = 33$ and $p = 0.5$.

What will be an ideal response?
Q. 2/ A quiz consists of 10 multiple choice questions, each with five possible answers, only one of which is correct. If a student guesses on each question, what is the mean and standard deviation of the number of correct answers?

A) mean: 2; standard deviation: 1.41421356 B) mean: 5; standard deviation: 2.23606798

C) mean: 2; standard deviation: 1.26491106 D) mean: 5; standard deviation: 1.26491106

Q. 3/ The sign test is used with $n = 9$ to test the null hypothesis that the new method and the old method produce equally high scores against the alternative hypothesis that the new method produces higher scores than the old.

If we obtain eight plus signs in subtracting (new score - old score), then with $\alpha = 0.05$, the null hypothesis should

A) be rejected since $6 < 7$. B) not be rejected since $6 < 7$.

C) be rejected since $7 < 8$. D) not be rejected since $7 < 8$.

Q. 4/ The binomial distribution Table V can be used to solve problems involving the binomial distribution if n has the values _____ and p has the values _____.

Q. 5/ In a school election, four candidates are running for president of assembly entertainment. Through a pre-election survey, the probabilities of each candidate's winning are

P (

A) = 0.31,

$P(B)$ = 0.27,

$P(C)$ = 0.24,

$P(D)$ = 0.18.

Candidate A is a senior, B is a sophomore, C is a senior, and D is a junior. What is the probability that a senior wins this election?

A) 0.45 B) 0.73 C) 0.0744 D) 0.55

Q. 6/ If x is a normal random variable with $\mu = 50$ and $\sigma = 6$, then the probability that x is not between 44 and 56 is

A) 0.6826. B) 0.3413. C) 0.8413. D) 0.3174.

Q. 7/ The alternative hypothesis can never contain an equal sign.
Q. 8/ Candy packaging Marketing researchers wonder if the color and type of a candy's packaging may influence sales of the candy.

They manufacture test packages for chocolate mints in three colors (white, green, and silver) and three types (box, bag, and roll). Suspecting that sales may depend on a combination of package color and type, the researchers prepare nine different packages, then market them for several weeks in convenience stores in various locations. In this experiment...

a. what are the experimental units?

b. how many factors are there?

c. how many treatments are there?

d. what is the response variable?

Answer: <https://biology-forums.com/index.php?topic=1698141>

Question 252

Blood pressure Researchers developing new drugs must be concerned about possible side effects. They must check a new medication for arthritis to be sure that it does not cause an unsafe increase in blood pressure. They measure the blood pressures of a group of 12 subjects, then administer the

drug and recheck the blood pressures one hour later. The drug will be approved for use unless there is evidence that blood pressure has increased an average of more than 20 points. They will test a hypothesis using

- Write appropriate hypotheses (in words and in symbols).
- In this context, which do you consider to be more serious - a Type I or a Type II error? Explain briefly.
- After this experiment produced inconclusive results the researchers decided to test the drug again on another group of patients. Describe two changes they could make in their experiment to increase the power of their test, and explain the disadvantages of each.

Answer: <https://biology-forums.com/index.php?topic=1934505>

Question 253

A state's Department of Education reports that 12% of the high school students in that state attend private high schools. The State University wonders if the percentage is the same in their applicant pool. Admissions officers plan to check a random sample of the over 10,000 applications on file to estimate the percentage of students applying for admission who attend private schools.

The admissions officers want to estimate the true percentage of private school applicants to within $\pm 4\%$, with 90% confidence. How many applications should they sample?

Answer: <https://biology-forums.com/index.php?topic=1934478>

Question 254

A study examined the number of trees in a variety of orange groves and the corresponding number of oranges that each grove produces in a given harvest year. Linear regression was calculated and the results are below.

Write the regression equation. Define all variables used in your equation.

Answer: <https://biology-forums.com/index.php?topic=1934349>

Question 255

According to Gallup, about 33% of Americans polled said they frequently experience stress in their daily lives. Suppose you are in a class of 45 students.

- What is the probability that no more than 12 students in the class will say that they frequently experience stress in their daily lives? (Make sure to identify the sampling distribution you use and check all necessary conditions.)
- If 20 students in the class said they frequently experience stress in their daily lives, would you be surprised? Explain, and use statistics to support your answer.

Answer: <https://biology-forums.com/index.php?topic=1934461>

Question 256

A total of 23 Gossett High School students were admitted to State University. Of those students, 7 were offered athletic scholarships. The school's guidance counselor looked at their composite ACT scores (shown in the table), wondering if State U. might admit people with lower scores if they also were athletes. Assuming that this group of students is representative of students throughout the state, what do you think?

Test an appropriate hypothesis and state your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934244>

Question 257

Describe the kind of bias that might be present if the administration decides that instead of subjecting people to random testing they'll just

- drop grains of rice on the aerial photo of the hill and inspect the trees that had rice land on them.
- ask the farmer to choose which trees he would like tested.

An article in a local newspaper reported that dogs kept as pets tend to be overweight. Veterinarians say that diet and exercise will help these chubby dogs get in shape. The veterinarians propose two different diets (Diet A and Diet B) and two different exercise programs (Plan 1 and Plan 2). Diet A: owners control the portions of dog food and dog treats; Diet B: a mixture of fresh vegetables with the dog food and substitute regular dog treats with baby carrots. Plan 1: three 30-minute walks a week; Plan 2: 20-minute walks daily. Sixty dog owners volunteer to take part in an experiment to help their chubby dogs lose weight. We intend to estimate the average driving time of a group of commuters. From a previous study, we believe that the average time is 42 minutes with a standard deviation of 7 minutes.

We want our 90 percent confidence interval to have a margin of error of no more than plus or minus 4 minutes. What is the smallest sample size that we should consider?

A) 2 B) 9 C) 34 D) 3 Consider a completely randomized design with five treatments. How many pairwise comparisons of treatments are made in a Bonferroni analysis?

A) 5 B) 20 C) 10 D) 5 = 120 There are 1,237 trees on the hill. Explain how to use a random digit table to select a simple random sample of 20 trees.

Then use the random digit table below to select the first five trees for your sample.

04905 83852 29350 91397 49531 78981 81980 08530

19994 65142 05087 11232 39129 49559 94540 24070
Q. 5 Suppose the number of babies born each hour at a hospital follows a Poisson distribution with a mean of 4. Find the probability that exactly seven babies are born during a randomly selected hour.

MULTIPLE CHOICE.

Choose the one alternative that best completes the statement or answers the question.
Q. 6 Consider a completely randomized design with k treatments. Assume all pairwise comparisons of treatment means are to be made using a multiple comparisons procedure. Determine the total number of treatment means to be compared for the value $k = 4$.

A) 8 B) 10 C) 6 D) 4
Q. 7 Explain why the last plan suggested above, selecting the ten trees closest to the parking lot, might be biased. Be sure to name the kind(s) of bias you describe and link it to the variable of interest.

What will be an ideal response?

Answer: <https://biology-forums.com/index.php?topic=1698041>

Question 258

Students A growing school district tracks the student population growth over the years from 2008 to 2013. Here are the regression results and a residual plot.

a. Explain why despite a high R-sq, this regression is not a successful model.

To linearize the data, the log (base 10) was taken of the student population. Here are the results.

b. Describe the success of the linearization.

c. Interpret R-sq in the context of this problem.

d. Predict the student population in 2014.

Answer: <https://biology-forums.com/index.php?topic=1934379>

Question 259

Sleep Do more than 50% of U.S. adults feel they get enough sleep? According to Gallup's December 2004 Lifestyle poll, 55% of U.S. adults said that they get enough sleep. The poll was based on a random sample of 1003 U.S. adults. Test an appropriate hypothesis and state your conclusion in the context of the problem.

Answer: <https://biology-forums.com/index.php?topic=1934188>

Question 260

Would it be better for customers for a year to have a negative residual or a positive residual from this model? Explain.

What will be an ideal response?
Q. 2 Would it be better for a customer buying a diamond to have a negative residual or a positive residual from this model? Explain.

In an effort to decide if there is an association between the year of a postal increase and the new postal rate for first class mail, the data were gathered from the United States Postal Service. In 1981, the United States Postal Service changed their rates on March 22 and November 1. This information is shown in the table below.
Q. 3 Interpret the intercept of your model in context.

What will be an ideal response?
Q. 4 Interpret the slope of your model in context.

What will be an ideal response?
Q. 5 Create a model to predict diamond costs from the size of the diamond.

What will be an ideal response?
Q. 6 A school board study found a moderately strong negative association between the number of hours high school seniors worked at part-time jobs after school hours and the students' grade point averages.

a.

Explain in this context what negative association means.

b. Hoping to improve student performance, the school board passed a resolution urging parents to limit the number of hours students be allowed to work. Do you agree or disagree with the school board's reasoning. Explain.

Answer: <https://biology-forums.com/index.php?topic=1698340>

Question 261

Gas mileage An important factor in the amount of gasoline a car uses is the size of the engine. Called "displacement", engine size measures the

volume of the cylinders in cubic inches. The regression analysis is shown.

- How many cars were included in this analysis?
- What is the correlation between engine size and fuel economy?
- A car you are thinking of buying is available with two different size engines, 190 cubic inches or 240 cubic inches. How much difference might this make in your gas mileage? (Show your work.)

Answer: <https://biology-forums.com/index.php?topic=1934346>

Question 262

Commuting to work The table shows how a company's employees commute to work.

- What is the marginal distribution (in %) of mode of transportation?
Car _____ Bus _____ Train _____
- What is the conditional distribution (in %) of mode of transportation for management?
Car _____ Bus _____ Train _____
- What kind of display would you use to show the association between job class and mode of transportation? (Just name a graph.)
- Do job classification and mode of transportation appear to be independent? Give statistical evidence to support your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1934068>

Question 263

Haircuts You need to find a new hair stylist and know that there are two terrific salons in your area, Hair by Charles and Curl Up & Dye. You want a really good haircut, but you do not want to pay too much for the cut. A random sample of costs for 10 different stylists was taken at each salon (each salon employs over 100 stylists).

- Indicate what inference procedure you would use to see if there is a significant difference in the costs for haircuts at each salon. Check the appropriate assumptions and conditions and indicate whether you could or could not proceed. (Do not do the actual test.)
- A friend tells you that he has heard that Curl Up & Dye is the more expensive salon.
 - Write hypotheses for your friend's claim.
 - The following are computer outputs. Which output is the correct one to use for this test? Explain.
 - Use the appropriate computer output to make a conclusion about the hypothesis test based on the data. Make sure to state your conclusion in context.

Answer: <https://biology-forums.com/index.php?topic=1934268>

Question 264

A young boy is fishing off the end of a dock. He estimates that for one out of every 15 times he casts his line, he gets at least a nibble from a curious fish. He is going to cast his line 50 times before he switches to toad hunting.

What is the probability that the fisherman will get 5 nibbles on his line.

Answer: <https://biology-forums.com/index.php?topic=1934427>

Question 265

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation - bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

Write a sentence or two about the conditional relative frequency distribution of modes of transportation for the boys.

Answer: <https://biology-forums.com/index.php?topic=1934054>

Question 266

Wildlife scientists studying a certain species of frogs know that past records indicate the adults should weigh an average of 118 grams with a standard deviation of 14 grams. The researchers collect a random sample of 50 adult frogs and weigh them. In their sample the mean weight was only 110 grams. One of the scientists is alarmed, fearing that environmental changes may be adversely affecting the frogs. Do you think this sample result is unusually low? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934466>

Question 267

Bowling A large corporation sponsors bowling leagues for its employees. The mean score for men was 154 pins with a standard deviation of 9 pins, while the women had mean score 144 pins and standard deviation 12 pins. At the end of the season the league holds a tournament that randomly pairs men and women as opponents in the first round.

- On average, how much do you expect the man to win by?
- Estimate the standard deviation of the differences in the competitor's scores.
- What assumption did you make in determining the standard deviation?

Answer: <https://biology-forums.com/index.php?topic=1934443>

Question 268

Carnivores A random sample of some of the heaviest carnivores on Earth was reviewed to determine if there is an association between the length (in meters) and weight (in kilograms) of these carnivores. Here are the scatterplot, the residuals plot, a histogram of the residuals, and the regression analysis of the data. Use this information to analyze the association between the length and weight of these carnivores.

- Is there an association? Write appropriate hypotheses.
- Are the assumptions for regression satisfied? Explain.
- What do you conclude?
- Create a 98% confidence interval for the true slope.
- Explain in context what your interval means.

Answer: <https://biology-forums.com/index.php?topic=1934291>

Question 269

Production Workers at a large factory finish shirts with a hand sewn logo. The foreman overseeing the workers tracks the level of production. After collecting data for several months he estimates that workers complete an average of 230 shirts each day with a standard deviation of 13 shirts. He also believes that a normal model is appropriate to describe the distribution.

- What is the probability that the workers will produce more than 250 shirts on a given day?
- Assuming that each day is independent, what are the chances that they will produce over 250 shirts for 3 days in a row?

Answer: <https://biology-forums.com/index.php?topic=1934301>

Question 270

Credit card sales The National Association of Retailers reports that 62% of all purchases are now made by credit card; you think this is true at your store as well. On a typical day you make 20 sales.

- Explain why your sales can be considered Bernoulli trials.
- What is the probability that your fourth customer is the first one who uses a credit card?
- Let X represent the number of customers who use a credit card on a typical day. What is the probability model for X ? Specify the model (name and parameters), and tell the mean and standard deviation.
- What is the probability that on a typical day at least half of your customers use a credit card?

Answer: <https://biology-forums.com/index.php?topic=1934180>

Question 271

Adult female Dalmatians weigh an average of 50 pounds with a standard deviation of 3.3 pounds. Adult female Boxers weigh an average of 57.5 pounds with a standard deviation of 1.7 pounds. One statistics teacher owns an underweight Dalmatian and an underweight Boxer. The Dalmatian weighs 45 pounds, and the Boxer weighs 52 pounds. Which dog is more underweight? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934323>

Question 272

Which is true about randomized experiments?

- Randomization reduces the effects of confounding variables.
 - Random assignment of treatments allows results to be generalized to the larger population.
 - Blocking can be used to reduce the within-treatment variability.
- A) III only B) I, II, and III C) I only D) I and III E) II only
- Q. 2 The principal of a small elementary school wants to select a simple random sample of 24 students. The school has 12 classrooms with 18 students in each class. She decides to randomly select two students from each classroom.
- Is this a simple random sample?
- Yes, because a stratified sample is a type of simple random sample.
 - No, because not all combinations of 24 students could have been chosen.
 - Yes, because each student had an equal chance to be selected.
 - No, because each student did not have an equal chance of being selected.
 - Yes, because the students were selected at random.
- Q. 3 Which of these is not an advantage of using a stratified sample instead of a simple random sample?
- the stratified sample eliminates the need for randomization

- B) the stratified random sample allows you to get information about each stratum
 - C) the stratified sample allows you to get more reliable estimates using the same sample size
 - D) the stratified sample reduces sample to sample variability
 - E) the stratified sample reduces bias
- Q. 4/Telephone poll The City Council decides to conduct a telephone poll.

Pollsters ask a carefully chosen random sample of adults this question: Do you favor the construction of a new prison to deal with the high level of violent crime in our State? In what way might the proportion of Yes answers fail to accurately reflect true public opinion? Explain briefly. What kind of bias is this?

Q. 5/To check the effect of cold temperatures on the battery's ability to start a car researchers purchased a battery from Sears and one from NAPA. They disabled a car so it would not start, put the car in a warm garage, and installed the Sears battery.

They tried to start the car repeatedly, keeping track of the total time that elapsed before the battery could no longer turn the engine over. Then they moved the car outdoors where the temperature was below zero. After the car had chilled there for several hours the researchers installed the NAPA battery and repeated the test. Is this a good experimental design?

- A) No, because the car and the batteries were not chosen at random.
- B) Yes
- C) No, because temperature is confounded by brand.
- D) No, because they should have tested more temperatures.
- E) No, because they should have tested other brands of batteries, too.

Q. 6/In an experiment the primary purpose of blocking is to reduce

- A) randomness.
- B) bias.
- C) undercoverage.
- D) variation.

Q. 7/Which is important in designing a good experiment?

- I. Randomization in assigning subjects to treatments.
- II. Control of potentially confounding variables.
- III. Replication of the experiment on a sufficient number of subjects.

A) I, II, and III B) I only C) II and III D) I and II E) I and III

Answer: <https://biology-forums.com/index.php?topic=1698026>

Question 273

Assembly line Your new job at Panasonic is to do the final assembly of camcorders. As you learn how, you get faster. The company tells you that you will qualify for a raise if after 13 weeks your assembly time averages under 20 minutes. The data shows your average assembly time during each of your first 10 weeks.

- a. Which is the explanatory variable?
- b. What is the correlation between these variables?
- c. You want to predict whether or not you will qualify for that raise. Would it be appropriate to use a linear model? Explain.

Answer: <https://biology-forums.com/index.php?topic=1934091>

Question 274

A large manufacturer of batteries knows that, historically, 10% of its batteries come off the production line defective, and the remaining 90% of batteries come off the production line in working condition. Conduct a simulation to estimate how many batteries the company needs to pull off the production line in order to be sure of ending up with 10 working batteries.

Show three trials by clearly labeling the random number table given below. Specify the outcome of each trial.

Trial 1:

10242 50692 18977 28370 82669 83236 77479 90618 43707 78695

Trial 2:

81183 48554 60809 39996 81915 25404 33366 92082 04822 79866

Trial 3:

06765 67041 20479 54612 13411 36837 69983 53082 43589 27865

Answer: <https://biology-forums.com/index.php?topic=1934381>

Question 275

Construct a 95 confidence interval for the population mean, μ . Assume the population has a normal distribution. A sample of 20 part-time workers had mean annual earnings of 3120 with a standard deviation of 677.

Round to the nearest dollar.

- A) (2135, 2567) B) (1324, 1567) C) (2657, 2891) D) (2803, 3437)

following events are mutually exclusive. One person is randomly selected from a church congregation: the person is female, the person is over 55 years of age.

A) not mutually exclusive B) cannot be determined C) mutually exclusive

Q. 3/ A social researcher in a particular school district wishes to obtain information on the number of school-age children (ages 6-17) per family.

A random sample of 250 households was selected from the district's records. Each was contacted and asked how many school-age children were in the household. Identify the data collection method.

A) designed experiment B) survey

C) observational study D) published source

Q. 4/ When using interval data, one cannot

A) set up inequalities. B) form differences. C) divide. D) do any of these.

Q. 5/ A computer package was used to generate the following printout for estimating the sale price of condominiums in a particular neighborhood.

X = sale_price

SAMPLE MEAN OF X = 46,400

SAMPLE STANDARD DEV = 13,747

SAMPLE SIZE OF X = 15

CONFIDENCE = 98

UPPER LIMIT = 55,713.80

SAMPLE MEAN OF X = 46,400

LOWER LIMIT = 37,086.20

What assumptions are necessary for any inferences derived from this printout to be valid?

A) The sample variance equals the population variance.

B) The population mean has an approximate normal distribution.

C) The sample was randomly selected from an approximately normal population.

D) All of these are necessary.

Q. 6/ College students' spending A consumer group wants to see if a new education program will improve the spending habits of college students. Students in an economics class are randomly assigned to three different courses on spending habits.

a.

What are the experimental units?

b. How many factors are there?

c. How many treatments are there?

d. What is the response variable?

Answer: <https://biology-forums.com/index.php?topic=1698187>

Question 276

A young boy is fishing off the end of a dock. He estimates that for one out of every 15 times he casts his line, he gets at least a nibble from a curious fish. He is going to cast his line 50 times before he switches to toad hunting.

Verify that this scenario satisfies all four conditions for a binomial scenario.

Answer: <https://biology-forums.com/index.php?topic=1934426>

Question 277

The owner of a small convenience store is trying to decide whether to discontinue selling magazines. He suspects that only 5% of the customers buy a magazine and thinks that he might be able to use the display space to sell something more profitable. Before making a final decision he decides that for one day he'll keep track of the number of customers and whether or not they buy a magazine.

Assuming the owner is correct in thinking that 5% of the customers purchase magazines, how many customers should he expect before someone buys a magazine?

Answer: <https://biology-forums.com/index.php?topic=1934421>

Question 278

There are 18 roller coasters in Virginia for which the lengths (in feet) were reported. Those lengths are listed in the table at the right.

a. Sketch a histogram for these data.

b. Find the mean and standard deviation of the roller coaster lengths.

c. Is it appropriate to use the mean and standard deviation to summarize these data? Explain.

d. Describe the distribution of roller coaster lengths.

Answer: <https://biology-forums.com/index.php?topic=1934058>

Question 279

Soft drinks A restaurant owner wanted to improve the efficiency of his employees. One way he tried to do this was to buy a machine that will automatically dispense 16 oz. of soda into a glass rather than have the employee hold the button on the dispenser. The actual amount dispensed by the machine can be represented by the model $N(16.2, 0.3)$

- Draw and clearly label the model.
- The sales representative who sold him the machine said, "95% of the glasses you fill with soda will fall between _____ and _____." Fill in the blanks based on the normal model, then comment on this claim.
- What is the 3rd quartile of amounts dispensed?
- If a glass will actually hold 16.7 oz. of soda, what percent of the time would you expect the glass to overflow?
- The manufacturer wants to reduce the overflow rate to only 1%. Assuming the mean amount dispensed will stay the same, what standard deviation must they achieve?
- Briefly explain what that change in standard deviation means in this context.
- A competing manufacturer says that not only will 98% of their glasses be safe from overflowing, but 70% will have more than 16 oz., reducing customer complaints. What Normal model parameters is that manufacturer claiming? Show your work.

Answer: <https://biology-forums.com/index.php?topic=1934343>

Question 280

The SPCA has kept these data records for the past 20 years. If they want to show the trend in the number of dogs they have housed, what kind of plot should they make?

A) pie chart B) bar graph C) boxplot D) timeplot E) histogram
Q. 2 Which of those variables about German Shepherds is most likely to be described by a Normal model?

- number of days housed
- veterinary costs
- age
- breed

E) weight
Q. 3 The SPCA collects the following data about the dogs they house. Which is categorical?

- weight
- number of days housed
- breed
- veterinary costs
- age

Q. 4 Soda cans A machine that fills cans with soda fills according to a Normal model with mean 12.1 ounces and standard deviation 0.05 ounces.

- If the cans claim to have 12 ounces of soda each, what percent of cans are under-filled?
 - Management wants to ensure that only 1% of cans are under-filled.
 - Scenario 1: If the mean fill of the cans remains at 12.1 ounces, what standard deviation does the filling machine need to have to achieve this goal?
 - Scenario 2: If the standard deviation is to remain at 0.05 ounces, what mean does the filling machine need to have to achieve this goal?
- Q. 5 House calls A local plumber makes house calls. She charges 30 to come out to the house and 40 per hour for her services. For example, a 4-hour service call costs $30 + 40(4) = 190$.

a. The table shows summary statistics for the past month. Fill in the table to find out the cost of the service calls.

Statistic Hours of Service Call Cost of Service Call

- Mean 4.5
Median 3.5
SD 1.2
IQR 2.0
Minimum 0.5

b. This past month, the time the plumber spent on one service call corresponded to a z-score of -1.50. What was the z-score for the cost of that service call?
Q. 6 Cats and dogs The table shows whether students in an introductory statistics class like dogs and/or cats.

- Like Dogs
Yes No Total
Like Cats Yes 194 21 215
No 110 10 120
Total 304 31 335

- a. What is the marginal distribution (in %) of liking dogs?
- b. What is the conditional distribution (in %) of liking dogs for students who like cats?
- c. What kind of display(s) would you use to examine the association between liking dogs and liking cats? (Just name a graph.)
- d. Do liking dogs and liking cats appear to be independent? Give statistical evidence to support your conclusion.

Answer: <https://biology-forums.com/index.php?topic=1698345>

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