

Question 1

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 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?
- 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.
- 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.
- 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?
- 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.
- 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 2

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.)

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

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

Question 3

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?
- 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.
- Find the expected value and standard deviation of Alphonso's winnings at this game.
- If they play this new game repeatedly which player has the advantage? Explain.

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

Question 4

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 5

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 6

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 7

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 8

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 9

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 10

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

a. Which dealer offers the cheapest car offered, and at what price?

b. Which dealer has the lowest median price, and how much is it?

c. Which dealer has the smallest price range, and what is it?

d. Which dealer's prices have the smallest IQR, and what is it?

e. Which dealer generally sells cars cheapest? Explain.

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

Question 11

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 12

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>