MTH 150 Test 3
Fall 2025

Elementary Statistics

When finished submit your answers by following the appropriate link on ***my Assignments page****.*
If you feel the answer is none of the choices given, submit no answer to the question.

1. What is your test ID ? **T3231A**

2. How many daily rainfall amounts in Wilkes-Barre must be randomly selected to estimate the mean daily rainfall amount? We want 99% confidence that the sample mean is within 0.010 in. of the population mean, and the population standard deviation is known to be 0.212 in.

(A) 30 **(B) 2982** **(C)** 1727 **(D)** 1094

3. The article "High-Dose Nicotine Patch Therapy," by Dale, Hurt, et al. (*Journal of the American Medical Association,* Vol. 274, No. 17) includes this statement: "Of the 71 subjects, we are 95% confident that the proportion of those that were abstinent from smoking at 8 weeks is between 58% and 81% ." Use that statement to estimate the true proportion of the population that did not smoke.

(A) 0.79 **(B) 0.695** **(C)** 0.651 **(D)** 0.725

4. An important issue facing Americans is the large number of medical malpractice lawsuits and the expenses that they generate. In a study of 1228 randomly selected medical malpractice lawsuits, it is found that 856 of them were later dropped or dismissed (based on data from the Physician Insurers Association of America). Construct a 99% confidence interval estimate of the proportion of medical malpractice lawsuits that are dropped or dismissed. **blank (0.662, 0.729)**

(A) (0.670, 0.722) **(B)** (0.662, 0.939) **(C)** (0.499, 0.900) **(D)** (0.652, 0.729)

5. Assume that a manager for E-Bay wants to determine the current percentage of U.S. adults who now use the Internet. How many adults must be surveyed in order to be 95% confident that the sample percentage is in error by no more than three percentage points? Use this result from a Pew Research Center poll: In 2006, 73% of U.S. adults used the Internet.

(A) 842 **(B)** 1058 **(C)** 11 **(D)** 99

6. Using samples to estimate population parameters with any degree of confidence seems risky at best. How can we quantifiably predict, with any kind of accuracy, the mean of a population from just one sample? The Central Limit Theorem guarantees that this distribution will very closely approximate the mean of the population but will not directly provide us with a reasonable prediction of the standard deviation of the population. In order to obtain a viable estimate the standard deviation of the population we must divide the standard deviation of this sampling distribution by the square root of the sample size. What name is given to the standard deviation of the sampling distribution of the means?

(A) "biased" estimate
(B) summary statistic
(C) **standard error**
(D) degree of freedom

7. A simple random sample of 50 adults (including males and females) is obtained, and each person's red blood cell count (in cells per microliter) is measured. The sample mean is 4.63. The population standard deviation for red blood cell counts is 0.54. What would be the margin of error in constructing a 98% confidence interval estimate of the mean red blood cell count of adults.

(A) 0.149 **(B)** 0.153 **(C)** **0.177** **(D)** 0.183

8. Several retired bicycle racers are coaching a large group of young prospects. They randomly select seven of their riders to take part in a test of the effectiveness of a new dietary supplement that is supposed to increase strength and stamina. Each of the seven riders does a time trial on the same course. Then they all take the dietary supplement for 4 weeks. All other aspects of their training program remain as they were prior to the time trial. At the end of the 4 weeks, these riders do another time trial on the same course. The times (in minutes) recorded by each rider for these trials before and after the 4-week period are shown in the following table.

Before:	103	97	111	95	102	96	108
After:	100	95	104	101	96	91	101

What would be the approximate margin of error in constructing a 98% confidence interval for the mean of the population differences, where the difference is equal to the time taken before the dietary supplement minus the time taken after the dietary supplement?

(A) 3.4 **(B)** 4.2 **(C)** **5.4** **(D)** 6.4

9. Use the movie data to construct a 98% confidence interval estimate of the mean gross amount for the population of all movies.

(A) (88.638, 157.361)
(B) (80.056, 135.932)
(C) (90.250, 145.749)
(D) **(81.725, 164.274)**

10. Randomly selected statistics students participated in an experiment to test their ability to determine when 1 min (or 60 seconds) has passed. Forty students yielded a sample mean of 58.3 sec. Assume $s =$ 9.5 sec. What would the margin of error be in constructing a 95% confidence interval estimate of the population mean of all statistics students?

(A) 3.038 **(B)** 2.944 **(C)** 3.643 **(D)** 3.494

11. The proper operation of typical home appliances requires voltage levels that do not vary much. Contained in the data file are ten voltage levels (in volts) recorded in a home on ten different days. These ten values have a standard deviation of $s = 0.15$ volt. Use the sample data to construct a 99% confidence interval estimate of the standard deviation of all voltage levels. Assume that daily voltage levels are normally distributed.

(A) (0.096, 0.310) **(C) (0.092, 0.340)**

(B) (0.009, 0.096) **(D)** (0.008, 0.115)

12. Lipitor is a drug used to control cholesterol. In clinical trials of Lipitor, 94 subjects were treated with Lipitor and 270 subjects were given a placebo. Among those treated with Lipitor, 7 developed infections. Among those given a placebo, 27 developed infections. What is the margin of error in constructing a 95% confidence interval for the difference in the proportions of infections for those treated with Lipitor and those given a placebo?

(A) 0.025 **(B) 0.063** **(C)** 0.463 **(D)** 0.089

13. The mean tar content of a simple random sample of 25 unfiltered king size cigarettes is 21.1 mg, with a standard deviation of 3.2 mg. The mean tar content of a simple random sample of 25 filtered 100 mm cigarettes is 13.2 mg with a standard deviation of 3.7 mg Construct a 90% confidence interval estimate of the difference between the mean tar content of unfiltered king size cigarettes and the mean tar content of filtered 100 mm cigarettes. **blank (6.758, 9.541)**

(A) (5.831, 9.768) **(C)** (5.832, 9.767)

(B) (6.158, 9.441) **(D)** (6.344, 9.265)

14. Researchers conducted an experiment to test the effects of alcohol. The errors were recorded in a test of visual and motor skills for a treatment group of 22 people who drank ethanol and another group of 22 people given a placebo. The errors for the treatment group have a standard deviation of 2.20, and the errors for the placebo group have a standard deviation of 0.72 . Construct a 95% confidence interval for the ratio of standard deviations of the errors in the treatment group to the placebo group. You may assume population normality.

(A) (2.487, 3.876) **(B)** (0.210, 0.507) **(C) (1.968, 4.742)** **(D)** (0.044, 0.257)

15. Refer to the sample data to construct a 90% confidence interval for the differences in the average weight of cola in cans of regular Coke and in the average weight of cola in cans of Diet Coke. Assume the population variances are equal.

(A) (0.589, 1.396) **(B)** (0.540, 1.520) **(C) (0.028, 0.036)** **(D)** (0.347, 1.950)

16. Decreasing the sample size, while holding the confidence level the same, will do what to the length of your confidence interval?

(A) make it bigger **(B)** make it smaller **(C)** it will stay the same

17. In estimating the ratio of two standard deviations we realize that the sampling distribution of the single point estimates is not normally distributed which further complicates the prediction of their ratios. In order to compensate for this, a new probability distribution had to be contrived. What is the name given to the probability distribution used to estimate the ratio of two (2) standard deviations is called the

(A) Fisher-Snedecor **(C)** Chi-Square

(B) Student's - *t* **(D)** Gamma

18. It is impossible to predict a confidence interval with an appropriate margin of error for the standard deviation because the probability distribution necessary to accomplish this

(A) is not symmetric **(C)** is leptokurtic

(B) is Student's - *t* **(D)** contains one degree of freedom

19. Are there more children diagnosed with Autism Spectrum Disorder (ASD) in states that have larger urban areas over states that are mostly rural? In the state of Pennsylvania, a fairly urban state, there are 245 eight year olds diagnosed with ASD out of 18,440 eight year olds evaluated. In the state of Utah, a fairly rural state, there are 45 eight year olds diagnosed with ASD out of 2,123 eight year olds evaluated. Is there enough evidence to show that the proportion of children diagnosed with ASD in Pennsylvania is more than the proportion in Utah? Test at the 1% level.

One way to answer this question us to start by constructing a 99% confidence interval for the difference in the proportions of those diagnosed with ASD in Pennsylvania and Utah. What would be this confidence interval?

(A) (- 0.014, - 0.001) **(C)** (- 0.013, - 0.002)

(B) (- 0.016, 0.000) **(D)** (0.347, 1.950)