

1 (6 Points)

A business currently has 5 telephone lines. Suppose the number of lines in use at any one time has the following distribution:

Phone lines	Probability
0 lines	.10
1 line	.28
2 lines	.44
3 lines	.14
4 lines	.02
5 lines	.02

What is the probability that *more than 2 lines* are in use?

- [1] 0.82
 [2] 0.62
 [3] 0.38
 [4] 0.18
 [0] no answer or skip this item

Submit Answer

2 (6 Points)

Suppose the amount of time that a customer waits to be admitted to a popular restaurant is uniformly distributed. The probability density function is $f(x) = 0.5$ for $0 < x < 2$, $f(x) = 0$ otherwise.

What is the probability that a customer will have to wait more than 30 minutes (0.5 hours)?

- [1] 1/3
 [2] 1/2
 [3] 3/4
 [4] 1/4
 [0] no answer or skip this item

Submit Answer

3 (6 Points)

You are given the following probability distribution where the expected value of x is 5:

x	4	5	6
Prob(x)	0.2	0.6	0.2

What is the standard deviation of X?

- [1] 0.72
- [2] 0.63
- [3] 0.46
- [4] 0.4
- [0] no answer or skip this item

Submit Answer

4 (6 Points)

In a state lottery game, a player can win either \$10,000, \$1000, or nothing. The probability is 1/10000 that the player wins the \$10,000 prize; the probability is 1/500 that the player wins the \$1000 prize.

From the state's point of view, what is the mean payout per player?

- [1] \$3
- [2] \$170
- [3] \$510
- [4] \$0
- [0] no answer or skip this item

Submit Answer

5 (6 Points)

Suppose that only 23% of all drivers come to a complete stop at an intersection having flashing red lights in all directions when no other cars are visible.

For a simple random sample of 50 such drivers, find the expected number of drivers who will come to a complete stop.

- [1] 11.5
- [2] 50. They all will come to a complete stop.
- [3] 38.5
- [4] 3.39
- [0] no answer or skip this item

Submit Answer

6 (6 Points)

Suppose the pulse rates for members of some population are normally distributed with mean equal to 63.9 beats and standard deviation equal to 8.

Use the **Interactive Tool** below.

What proportion of people in this group has a pulse rate less than 57.9?

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- [1] About 0.2266
- [2] About 0.7734
- [3] About -0.75
- [4] About 0.25
- [0] no answer or skip this item

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7 (6 Points)

A decrease in the mean causes the normal curve _____.

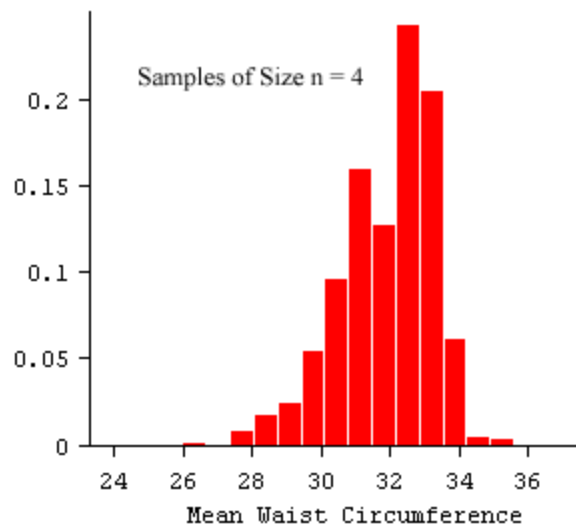
- [1] to become less peaked
- [2] to become more peaked
- [3] to shift to the right
- [4] to shift to the left
- [0] no answer or skip this item

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8 (6 Points)

A population of 878 students measured their waist sizes in inches. The histogram displays the sampling distributions of the **sample mean** for random samples of **$n=4$ students**.

For $n=4$, which of the following is *not* true regarding the sampling distribution for the sample mean?



- [1] The shape of the sampling distribution is skewed towards the higher values.
- [2] The center of the sampling distribution is about 32 inches.

- [3] The sample means are spread from about 26 inches to about 36 inches.
- [4] All of the above are true.
- [0] no answer or skip this item

Submit Answer

9 (6 Points)

The average height of the students in a large university is 68 inches, and the s.d. is 3 inches. Imagine choosing 25 students at random from the university, and finding the mean height of the sample of 25.

The standard deviation of the sample mean is closest to

- [1] 0.12
- [2] 0.6
- [3] 3
- [4] 15
- [0] no answer or skip this item

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10 (6 Points)

Assume that 40% of residents of San Francisco are covered by earthquake insurance. The people covered by earthquake insurance have value '1', and those not covered have value '0.' Thus the population mean is 0.40. The population standard deviation is 0.490.

Use the **Interactive Tool** below.

The probability that the sample mean of 400 observations will be between 0.37 and 0.43 is closest to

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- [1] About 0.03
- [2] About 0.11
- [3] About 0.39
- [4] About 0.78
- [5] About 1.00
- [0] no answer or skip this item

Submit Answer

11 (6 Points)

Which scenario illustrates the chi-squared distribution involving the sample variance from normal samples?

- [1] If we take a sample of $n=100$ people from a population with standard deviation of heights of $s=3$ inches, then we can ask if the sample standard deviation is between 2 and 4 inches.
- [2] If we take a sample of $n=100$ people from a population with standard deviation of heights of $s=3$ inches, then we can ask if the sample standard deviation is less than 2 inches.
- [3] If we take a sample of $n=1,000$ people from a population with standard deviation of heights of $s=3$ inches, then we can ask if the sample standard deviation is between 2.5 and 3.5 inches.
- [4] All of the above.
- [0] no answer or skip this item

Submit Answer

12 (6 Points)

A computer randomly generated 1000 confidence intervals for a mean. A total of 896 of the confidence intervals captured the true mean of the population.

Which of the following best estimates the confidence level in this situation?

- [1] 50%
- [2] 68%
- [3] 90%
- [4] 95%
- [0] no answer or skip this item

Submit Answer

13 (6 Points)

In March 2001, the results of a poll indicated that 65% of Americans said they were either somewhat or very concerned about "Mad Cow" disease. The survey is considered to be 95% accurate within 3 percentage points.

What is the 95% confidence interval for the percentage of Americans who said that they were either somewhat or very concerned about "Mad Cow" disease?

- [1] We can be 95% confident that between 60% and 70% of Americans said they were either somewhat or very concerned about "Mad Cow" disease.
- [2] We can be 98% confident that between 60% and 70% of Americans said they were either somewhat or very concerned about "Mad Cow" disease.
- [3] We can be 95% confident that between 62% and 68% of Americans said they were either somewhat or very concerned about "Mad Cow" disease.
- [4] We can be 95% confident that between 63% and 67% of Americans said they were either somewhat or very concerned about "Mad Cow" disease.
- [0] no answer or skip this item

Submit Answer

14 (6 Points)

A environmentalist examined the average amount of garbage produced per week by 129 randomly selected households. Based on the data collected, she calculated 90%, 95%, 98% and 99% confidence interval for the true average amount of garbage produced per week.

Which of the following must be the 99% confidence interval?

- [1] 29.0 to 35.4
- [2] 28.7 to 35.7
- [3] 30.0 to 34.4
- [4] 29.5 to 34.9
- [0] no answer or skip this item

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15 (11 Points)

Wanting to estimate the average amount of time students spent studying in a 24-hour period, an instructor selected a random sample of 64 students majoring in science.

Use **WebStat** in the Interactive Tool below to calculate a 90% confidence interval for the true average amount of times spent studying by the students. Use a standard deviation of 3 hours. Load from "Data>Sample data" the data set **Sci_majors_study_hours.dat** to answer the following question.

Which statement correctly summarizes the confidence interval?

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Tool!**

- [1] We can be 90% confident that the true average amount of time students spent studying in a 24-hour period is between 3.06 and 4.53 hours.
- [2] We can be 90% confident that the true average amount of time students spent studying in a 24-hour period is between 3.18 and 4.41 hours.
- [3] We can be 90% confident that the true average amount of time students spent studying in a 24-hour period is between 3.30 and 4.29 hours.
- [4] We can be 90% confident that the true average amount of time students spent studying in a 24-hour period is between 3.73 and 3.86 hours.
- [0] no answer or skip this item

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16 (10 Points)

A random number generator produces the digits 0 through 9 randomly.

What is the probability that a random digit will be more than 3?

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17 (10 Points)

A gene is called 'lethal' (L) if offsprings who receive 2 copies of the gene fail to develop. A cross of parents with one copy each of a dominant 'lethal' gene results in 2/3 of the offspring being carriers of the gene. The combination LL is never born, as illustrated in this table, with l being recessive:

Lethal Gene	father L	l	
Mother L	(L, L)	(L, l)	P(L, L) = 1/4 embryo fails to form
l	(L, l)	(l, l)	P(carrier) = P(L, l) = 2/3 of children born

You examine 60 offspring from this cross and count the number of offspring x who are carriers of the lethal trait.

Find the mean and the standard deviation of x .

Submit Answer

18 (10 Points)

Imagine two scales for weighing objects. Scale A is accurate to within 1 ounce, which means the standard deviation of the weighings when weighing an object many times will be about 1 ounce. Scale B is much better. It is accurate to within 0.2 ounces. Assume that weighings on the scales are independent of each other, and that the scales are unbiased. That is, the mean of many, many weighings of an object will be essentially the true weight of the object.

The standard deviation for Scale A is 5 times that for Scale B. Does that mean one needs to take the mean of 5 times as many weighings from Scale A as from Scale B in order to achieve the same accuracy? If not, how many times is required?

Submit Answer

19 (10 Points)

Imagine taking a random sample from a large university, looking at the weights of the people in the sample. For the entire university, the average weight is 140 pounds, and the standard deviation is 30 pounds.

If the sample has $n = 100$ people, what is the chance that the sample standard deviation is between 25 and 35 pounds?

Submit Answer

20 (10 Points)

In a taste test, each of 50 people tastes two brands of soft drink and indicates which soda tastes better. We'll refer to the two brands as Brand A and Brand B. Assume the 50 participants have been sampled from a population in which there's an equal preference for the two sodas. In other words, assume $p=0.5$ where p is the probability that a randomly selected person prefers Brand A.

The sampling distribution of the number of people who prefer Brand A is a binomial distribution. What are the values of n and p for this model?

Submit Answer

21 (11 Points)

The Graduate Record Examination (GRE) is a test taken by college students who intend to pursue a graduate degree in the United States. A longterm average for the verbal ability portion of this exam of all college seniors and graduates who take this exam is 494, with a standard deviation of 115. Assuming that the histogram of all GRE scores follows the normal curve, answer the following question.

To answer this question, you should use a normal curve calculator or a normal table of your choice.

A graduate school program in English will admit only students with GRE verbal ability scores in the top 30%. What is the lowest GRE score you must have to be accepted in this graduate program?

Submit Answer

22 (11 Points)

The heights of women have a distribution that is approximated by a normal curve with a mean of 65 inches and a standard deviation equal to 2.7 inches.

Use the **Interactive Tool** below.

About what proportion of women are taller than 72 inches?

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Tool!**

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23 (11 Points)

An experiment is done to identify people who might have extrasensory perception (ESP). In each of 20 trials, the researcher randomly selects one of four cards. The participant "guesses" which card has been selected.

Use the **Interactive Tool** below.

Would it be unusual for somebody who is randomly guessing to correctly guess at least 8 times? Support your answer with the relevant probability calculation.

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24 (11 Points)

An example from class contained data on people's political interest, intention to vote, and amount of high school education. We reorganize the data below into two tables, one for people with some high school education and one for people with no high school education. In each table, we look at the relationship between amount of political interest and whether the person intends to vote:

	Some High School	
Political Interest	Intends to vote	Does not intend to vote

Great	490	5
Moderate	917	69
None	74	58

The chi-squared statistic for testing the independence of intention to vote and political interest for those with **some** high school is 260.34.

	No High School	
Political Interest	Intends to vote	Does not intend to vote
Great	279	6
Moderate	602	67
None	145	100

The chi-squared statistic for testing the independence of intention to vote and political interest for those with **no** high school is 183.78.

Use the **Interactive Tool** below.

What is the chance a chi-squared distribution with those degrees of freedom (that are obtained from the No High School table) exceeds 183.78?

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25 (11 Points)

An instructor at Penn State University wanted to estimate the average amount of time students spend watching television. She asked a random sample of 80 students in her introductory statistics class how many hours of TV, to the nearest hour, they watched the night before.

The students' responses are recorded in the **TV_watching_hours-PennState_students** data set. Use the **WebStat** Interactive below with the data loaded.

Are you willing to conclude that the average amount of time the population of students watched TV was more than 1 hour? Why or why not? Use a 95% confidence interval for the mean to support your answer.

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**When you are done answering all questions above to your satisfaction,
press the button below to complete your test.**