

Directions: Begin in cell #1. Read the question carefully and show all work necessary to answer it, even if you use a calculator and/or a formula sheet. Circle your answer and then search for it. When you find it, call it cell #2 and proceed in this manner until you complete the circuit. Have fun!

1 Answer: 0.31

The Dean of Residential Life at a boarding school needed to survey a sample of students from the school. From each dormitory the Dean randomly selected 5% of the students to participate in the survey. The Dean performed what kind of sampling? If _____ sampling, go to answer _____.

Cluster, 16 Convenience, 10 Simple Random, 14.45 Stratified Random, 8 Systematic Random, 1.24

_____ Answer: 1.24

The Exercise Science department at The University of Mississippi selects a random sample of students who participate in the intramural sports program to take part in an experiment. Which of the following is the largest population to which the results can be generalized?

A. All Division I athletes who attend The University of Mississippi. Go to 16.
 B. All students in the intramural program at The University of Mississippi. Go to 19.
 C. All students in the Exercise Science program at The University of Mississippi. Go to 14.
 D. Results cannot be generalized since there was no random assignment. Go to 20.

_____ Answer: 0.43

The back-to-back stem plot shows the resting pulse rate and the pulse rate after running 1 lap on the school track for 20 students. Compare the distributions.

Resting		After Running
9 8 7 7	6	
8 8 7 6 5 4 0	7	
4 3 2 1 1 0	8	1 1 2 3 5
6 5	9	0 4 6 7 7 8 8 9
	10	2 2 3 4
	11	5
	12	
	13	4

Pulse Rates (bpm)
KEY: 13 | 4 = 134

Find the median for each distribution and search for the higher one.

_____ Answer: 20

Look at the back-to-back stem plot in the question above. A potential outlier for the resting data is _____ and a potential outlier in the after running data is _____. Determine if these two values are outliers as defined by the 1.5 times the IQR rule. The resting interquartile range (IQR) is 10.5 bpm and the after running IQR is 14.5 bpm.

If both are outliers, go to 14. If neither is an outlier, go to 10. If only one is an outlier, go to 14.45.

Answer: 14

The graph of a population distribution with mean 100 and standard deviation 15 is skewed left. Which sentence describes the sampling distribution of \bar{x} for samples of size $n = 50$ taken from the population?

Skewed left with mean 100 and standard deviation 15. (go to 1.82)

Skewed left with mean 100 and standard deviation less than 15. (go to 14.45)

Approximately normal with mean 100 and standard deviation 15. (go to 0.04)

Approximately normal with mean 100 and standard deviation less than 15. (go to 10)

Answer: 8

The table shows responses from 208 people who were asked if they support moving the city hospital.

Response	Under the Age of 50	Age 50 or Older
Yes	34	20
No	101	53

One person from those who responded will be selected at random. (Round answers to nearest hundredth).

(a) What is the probability that the person selected will be someone who responded no, given that the person selected is under age 50?

(b) What is the probability that the person selected will be someone who said no and who is under the age of 50?

To advance in the circuit, find the sum of your answers: _____

Answer: 1.82

A quality control engineer knows that 1% of all items coming off the main assembly line will be defective. Suppose that 60 items produced on the assembly line will be inspected. What is the probability that exactly 3 of the 60 items will be defective?

Answer: 0.05

Mars, Inc., makes M&M candies. The company claims that the distribution of color is as follows: 13% Brown, 14% Yellow, 20% Orange; 16% Green, 24% Blue; and 13% Red. A statistics class found the following observed values: Brown 58, Yellow 100, Orange 110, Green 82, Blue 80, and Red 52.

What is the contribution of the green candies to the calculation of the chi-square statistic?

Answer: 19

Data were collected on the hand span (in cm) and the number of candies grabbed by each student in Lafayette High School's statistics class. The least squares regression line is $\hat{y} = -18.74 + 1.83x$ where x = hand span (in cm) and y = number of candies grabbed.

(a) Interpret the slope in the context of the problem.

(b) Aiden's hand span is 24 cm and he grabbed 27 candies. To advance in the circuit, calculate the residual.

Answer: 14.45

A study was conducted with a random sample of 20 adults who suffer from chronic fatigue syndrome to investigate the effectiveness of a drug for increasing energy. The average increase in energy level on a 1-10 scale was $\bar{x} = 2.4$ and a one-sample t-test for μ yielded a test statistic of 2.0925. All conditions for inference were met. Find and interpret the p - value.

Does this result provide convincing evidence at the $\alpha = 0.05$ level that true average increase in energy level for all chronic fatigue syndrome sufferers is greater than 0? Explain.

To advance in the circuit, search for the p -value.

Answer: 0.02

Veterinarians know that the distribution of the weight of female chihuahuas is approximately normal with a mean of 3.92 pounds and a standard deviation of 1.43 pounds. What proportion of female chihuahuas weigh between 2 and 4 pounds?

Answer: 16

In a recent conversation with Mrs. Cornelius, Mr. Wilcox claimed that the weather in Michigan was much cloudier than the weather in Mississippi. To investigate Mr. Wilcox took a random sample of 30 days from the past year and recorded whether or not it was cloudy in Michigan. Mrs. Cornelius took a separate random sample of 30 days from the past year and recorded whether or not it was cloudy in Mississippi. Which inference procedure is most appropriate to assess Mr. Wilcox's claim?

If... A one-sample z-test for a proportion, then go to... 14.45.

If... A two-sample z-test for a difference in proportions, then go to.... 20.

If... A t-test for slope, then go to... 10.

If... A two-sample t-test, then go to... 0.025.

If... A matched pairs t-test, then go to... 2.403.

Answer: 97.5

A company that manufactures Rosacea cream wants to investigate whether its new cream is more effective in reducing skin redness as compared to its original cream. 400 volunteers who suffer from Rosacea agree to participate in a study. The volunteers were randomly assigned to one of two groups of equal size. The first group received the original cream and the second group received the new cream. At the end of four months, the average reduction of skin redness was calculated by comparing beginning and ending facial recognition. Circle the description(s) that fit this scenario and then sum all number(s) you circled to advance in the circuit.

2 experiment

8 cluster sample

14 completely randomized design

4 observational study

10 stratified sample

16 convenience sample

6 simple random sample

12 matched pairs design

18 placebo

Answer: 0.025

A significance test was performed at the $\alpha = 0.05$ to make a decision. All conditions for inference were met.

Complete all four cells for the table. The choices for the cells are: Type I error, Type II error, Power, and 😊.

Truth about the Population

H_0 true

H_a true

Conclusion based on sample

Reject H_0

Fail to reject H_0

What is the probability of a Type I error?

Answer: 10

Based on a survey of n randomly selected students from a large high school, a 95% confidence interval for the population proportion of students who have at least one pet is (0.272, 0.628).

What is the point estimate? _____

What is the margin of error? _____

What is the sample size? _____

To advance in the circuit, find the product of all your answers. _____

Answer: 2.403

What is the expected value of the random variable X ?

X	5	10	15	20	25
$P(X)$	0.1	0.2		0.15	0.07