



Solutions

Algebra II Journal
Module 4: Inferences
Simply Surveying

This journal belongs to:



Algebra II Journal: Reflection 1

Respond to the following reflection questions and submit to your teacher.

How does the sample mean for the ten states (39.29 inches) compare to the population mean of 28.15 inches?

Answer:

The sample mean is significantly higher than the population mean.

How does the population mean of 28.15 inches compare to the average snowfall of Maryland (20.6 inches)?

Answer:

The population mean is significantly higher than the average snowfall in Maryland.

The population standard deviation is 27.437 inches. The sample standard deviation is 30.688 inches. What do these values say about the data?

Answer:

The population standard deviation is lower than the sample standard deviation. This indicates the population data is less variable and more consistent than the sample data.

Allyson's hypothesis was that Maryland gets more snow than any other state. Marissa's hypothesis was that Maryland gets about the same amount of snow as the United States. (A hypothesis is a statement made about the population parameter.) Can either hypothesis be supported by the sample statistics? Use what you know about statistics to justify your answer.

Answer:

Maryland, on average, gets less snowfall than the other states in the United States. Both the population mean and the sample mean are greater than the average snowfall in Maryland. Neither of the girls' hypotheses is supported by the data. There is evidence to reject the hypotheses.

Algebra II Journal: Reflection 2

Here are some statistical surveys you can conduct right in your own school!

1. Would you be in favor of a class period devoted to studying and completing homework?
2. Which is more preferred: Eating dinner in a restaurant or eating a home-cooked meal?
3. What is the average height of high school students?
4. Which Internet search engine is most used?

Respond to the following reflection questions and submit to your teacher.

Choose a survey to complete. You may choose one of the surveys above, or design one of your own.

Answer:

Answers will vary based on the surveys the students complete. Note the students should save their work for later use in this module.

Determine the population you are surveying.

Answer:

Answers will vary.

State your hypothesis.

Answer:

Answers will vary.

Design the survey you will distribute in order to obtain a simple random sample.

Answer:

Answers will vary.

Identify who will be in your sample.

Be sure the survey will produce the intended sample you need for your intended population.

Answer:

Answers will vary.

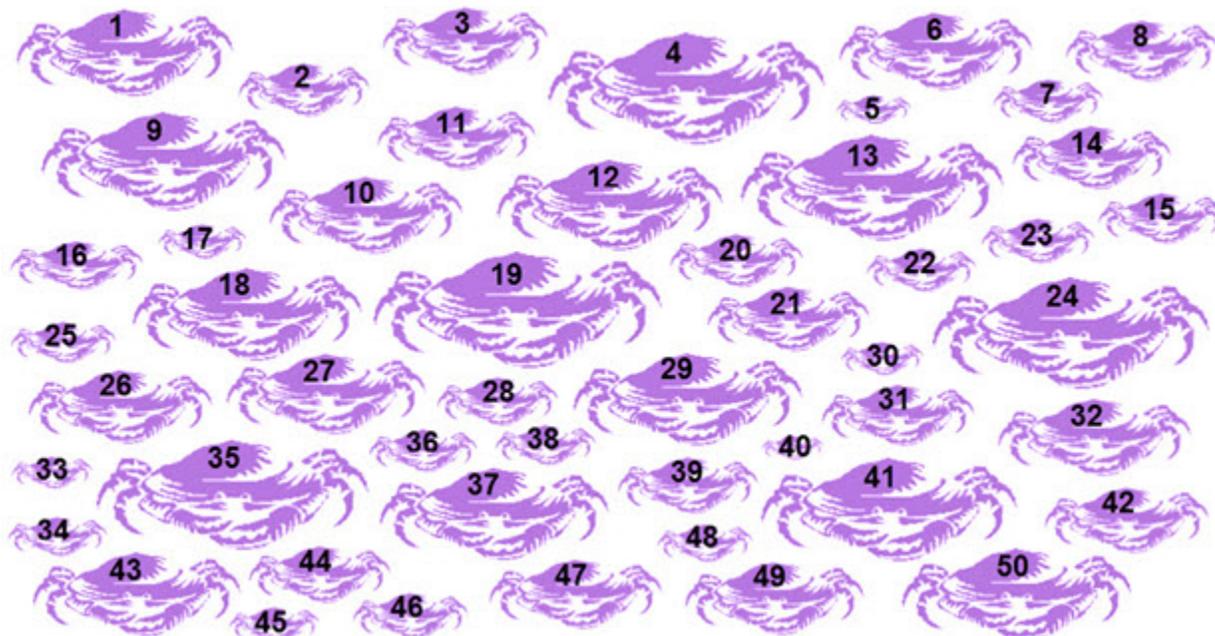
Determine how you will conduct your survey. Be sure your method will produce a simple random sample!

Answer:

Answers will vary.

Algebra II Journal: Reflection 3

Pictured here is a colony of fifty "purple tsunami crabs."



Module 4: Inferences

Each crab can be identified by the number that appears on its shell. The table below shows the length of each crab. Note that a crab is measured by the length of its top shell, excluding the legs.



Crab Number	Shell Length	Crab Number	Shell Length
1	30	26	27
2	19	27	29
3	24	28	18
4	39	29	33
5	10	30	12
6	27	31	22
7	15	32	28
8	22	33	11
9	39	34	14
10	28	35	40
11	23	36	16
12	32	37	33
13	38	38	15
14	22	39	20
15	17	40	9
16	19	41	37
17	13	42	24
18	33	43	30
19	42	44	20
20	19	45	12
21	23	46	17
22	16	47	25
23	16	48	13
24	40	49	26
25	14	50	33

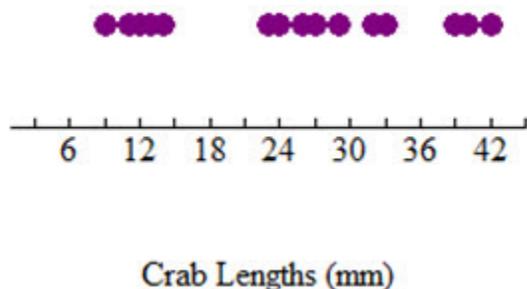
Crab Number	Shell Length (millimeters)
MEAN=	

Make a dot plot of your data using the number line below, or using your graphic calculator or [Shodor Applet](#). See the Calculator Resources for instructions about creating a histogram as an alternative to creating a dot plot.

Answer:

Answers will vary. Sample answer:

Below is the dot plot created by the crabs that I randomly selected using a random number generated.



Now respond to the following reflection questions and submit to your teacher.

Describe the shape, center and spread of the distribution of sample mean from the first dot plot you made. This was the dot plot where you selected any crabs you wanted.

Answer:

Answers will vary. Sample answer:

The graph is skewed left. The mean of this sample data is 13.5. The data is clustered about the mean, and the data ranges from 9 millimeters to 18 millimeters only. The standard deviation of this sample is 2.30, which is relatively low showing the data is consistent.

Describe the shape, center and spread of the distribution of sample mean from the second dot plot you made. This was the dot plot where your selection of crabs was randomly selected.

Answer:

Answers will vary. Sample answer:

The dots in the graph are evenly distributed across the range of 9 millimeters to 42 millimeters. There is a small gap between 14 millimeters and 23 millimeters. The mean of the sample data 24.93, and the standard deviation is 10.75. The standard deviation is high, showing the data has a large variation.

Describe the key differences between the two distributions of sample means.

Answer:

Answers will vary. Sample answer:

The means are very different. The mean of the sample from which I chose the crabs is very low compared to the sample mean of the randomly chosen crabs.

Decide which sampling method you think is the better one for estimating the population mean by a sample mean, and explain your reasoning.

Answer:

Answers will vary. Sample answer:

The random sampling method is much more representative of the population of crabs. The mean, standard deviation and range of the sample give a better description of the actual true measurements of all the crabs. The first set of sample data from which the crabs were selected by choice is biased, only representing the smallest of the crabs.

Algebra II Journal: Reflection 4

Respond to the following reflection questions and submit to your teacher.

Return to the survey you designed (or selected) previously in this lesson. Explain why it is better to obtain a random sample of your population.

Answer:

Answers will vary based on the surveys the students complete. Note the students should save their work for later use in this module.

Justify why your survey produces a simple random sample.

Answer:

Answers will vary.

Justify why your survey will be a statistically accurate representation of your intended population.

Answer:

Answers will vary.

Conduct your survey, and organize the data you receive. You may choose to use a table, graph, etc.

Answer:

Answers will vary.