Stats

Name: Key

Chapter 3 Review

Date: _____

1. Define the following terms:

Parameter of Interest: The thing that you are trying to find using statistical Analysis

Sample: The group of the population you are going to find the parameter of

Undercoverage: The sample is not a good representation of the population

Experiment: A statistical analysis with multiple testing groups

Margin of Error: How far away our confidence interval is from our

Population: The overall group you want to study

Voluntary Response Bias: The person responds to an invitation to be in the survey

Nonresponse Bias: A person chooses not to respond to the survey

Observational Study: A statistical analysis based on observations of the sample

Confidence Interval: A interval that we belive holds the answer to the parameter of interest for the entire population

2. Describe the difference between good data and bad data.

Good data is...

- limited in Bias
- Knowledge and research based
- Accounts for discrepancies
- Outcomes are not influenced

3. For each of the following problems, determine whether the question is biased or neutral and rewrite the question if it is biased.

a. Don't you agree that the voting age should be lowered to 16 because many 16-year-olds are responsible and informed?

Biased

Do you agree that the voting age should be lower to 16?

b. Do you feel that the school needs a new baseball field or a new science lab?

Neutral

c. Due to diminishing resources, should a law be made to require people to recycle?

Biased

Do you agree that a laws should be created to require people to recycle?

4. Determine whether the following questions are valid statistical questions. Explain your reasoning.
   a. What are the heights of the players on the Chicago Bulls basketball team?

   Valid

   b. What color M&M appears most often in 1.69 oz bags of the candy?

   Valid

   c. What is your favorite soda?

   Not Valid one answer only

   d. How many words are there in the Pledge of Allegiance?

   Not Valid one answer

5. The local school board wants to get teachers to approve a new textbook. They select 50 teachers and find that 12% approve of the new textbook.

   Population: Teachers of the school district Sample: 50 teachers Parameter of interest: Textbook approval %.

6. Billy wants to know how many hours of homework students in his school do. There are 2536 students in his high school; he asks the first 50 that he sees in the morning.

   Population: 2536 students Sample: 50 students Parameter of interest: Hours of homework

7. One thousand engineers were asked if they felt that being a college graduate prepared them for the real world.
   a. Where is the bias in this situation?

   Only asking engineers is college prepared them for the real-world

   b. How would you minimize the bias?

   As other professions that require a college degree

8. A company invented a new diet plan and wants to show that it is the best. They ask 100 people who have been following the plan for the last year if they lost weight.
   a. Where is the bias in this situation?

   Asking people if they lost weight

   b. How would you minimize the bias?

   Use an observational study instead of a survey

9. A magazine reported that 52% of car owners wash their own cars instead of taking it to a car wash. Researchers select a group of 40 random car owners and asked them the same question. The 95% confidence interval for the percentage of owners wash their own car is between 22.5% and 47%.

   a. Interpret the confidence interval.

   They are 95% confident that the true percentage is between 22.5 and 47

   b. Calculate the point estimate and the margin of error.

   PE → $\frac{47 + 22.5}{2} = 34.75$

   M.E → $47 - 34.75 = 12.25$

   c. Based on the confidence interval is it plausible that the true percentage of owners that wash their car is 52%? Explain.

   Nope the 95% CI is below 52%.

10. Tim purchased a random sample of potatoes at a local grocery store. The 95% confidence interval for the mean weight of all potatoes at store is .5 Lbs. to .75 Lbs.

   a. Interpret the confidence interval.

   The true mean weight of a bag of potatoes is between .5 and .75 lbs

   b. Calculate the point estimate and the margin of error.

   $\frac{.5 + .75}{2} = 0.625$

   $.75 - .625 = .125$

   c. The label on the bags of potatoes says that a typical potato weights .67 Lbs. Does the interval provide convincing evidence that the company is correct.

   Yes

11. Find the population mean and population standard deviation for the following data set by hand.

Age at First Job

15	21	17	21	15	16	15
18	15	19	21	14	15	[redacted]
18						15

$2^2 + 4^2 + 4^2 + 2^2 + 1^2 + 2^2 + 1^2 + 2^2 + 2^2 + 4^2 + 3^2 + 2^2 + 2^2 + 1^2$

Mean: 17 Standard Deviation: 2.42

12. Find the population mean and population standard deviation for the following data set by hand.

Car Weights (kg)

1,395	1,820	1,705	1,480	1,525
1,640	1,475	1,300	1,405	1,195
1,030	1,060	1,595	1,695	1,440
1,235				

Mean: 1437.19 Standard Deviation: 222.35

13. Find the population mean and population standard deviation. Then calculate the margin of error.

Shoe Size

7	10	8	8.5	7	7	5
11	8	5.5	7	8.5	8	7
7.5	8.5					

Mean: 7.72 Standard Deviation: 1.44 Margin of Error: ± .71

14. Find the population mean and population standard deviation. Then calculate the margin of error.

Annual Household Income

14,550	12,150	46,800	26,900
10,450	12,600	9,300	10,550
23,300	10,500	9,600	36,950
37,600	43,000	23,550	28,050

Mean: 22240.63 Standard Deviation: 12598.04 Margin of Error: ± 6173.04