Introduction to the Practice of Statistics

Definitions

- Statistics = the science of collecting, organizing, summarizing, and analyzing information to draw conclusions or answer questions. In addition, statistics is about providing a measure of confidence in any conclusions.

Definitions

- Population = entire group of individuals to be studied
- Individual = a person or object that is a member of the population being studied
- Sample = A subset of the population that is being studied

Definitions

- statistic = a numerical summary of a sample
- Parameter = a numerical summary of a population.

1. Determine whether the underlined value is a parameter or a statistic (Similar to p.11 #7-14)

The average grade for a class of 25 students in Elementary Statistics was <u>83.2%</u>

2. Determine whether the underlined value is a parameter or a statistic (Similar to p.11 #7-14)

In a survey of 12000 high school students, <u>74%</u> of respondents indicated that they had cheated at least once on an exam in the past year.

Source: http://abcnews.go.com/Primetime/story?id=132376&page=1

3. Determine whether the underlined value is a parameter or a statistic (Similar to p.11 #7-14)

In a survey, it was found that 10% of married people have had extramarital affairs in the last year.

Source: http://www.nytimes.com/2008/10/28/health/28well.html

4. Determine whether the underlined value is a parameter or a statistic (Similar to p.11 #7-14)

In a particular Elementary Statistics class only 50% of guys wash their hands after using the bathroom.

The Process of Statistics

1. Identify the research objective
2. Collect the data needed to answer the question(s) posed in (1)
3. Describe the data
4. Perform inference

5. Determine the research objective, the population being studied, and the sample. (Similar to p.13 #49)

Investigation of Repetitive Transcranial Magnetic Stimulation in Depressed Adolescents
This research proposal aims to better understand the neurobiology of depression in adolescents and how repetitive transcranial magnetic stimulation (rTMS) may therapeutically impact brain function and mood. This research will be the first study evaluating metabolic changes in the brain as a result of rTMS treatment in depressed adolescents using magnetic resonance spectroscopy (MRS).

Source: http://clinicaltrials.mayo.edu/clinicaltrialdetails.cfm?trial_id=101715&location=4&theme_id=2&letter=none&eKeyword=none

6. Determine the research objective, the population being studied, the sample, and the descriptive statistics. (Similar to p.13 #49)

Beatbullying found that up to 44% of suicides among 10- to 14-year-olds may be bullying-related. The charity said 26 out of the 59 cases reported in the national media were linked to intimidating behaviour.

Source: http://www.bbc.co.uk/news/10302550

Definitions

- Descriptive statistics = consist of organizing and summarizing data. Descriptive statistics describe data through numerical summaries, tables, and graphs
- Inferential Statistics = Uses methods that take a result from a sample, extend it to the population, and measure the reliability of the result.

Definitions

- Variables = the characteristics of the individuals within the population (weight, age, etc.)
- Qualitative or Categorical Variables = allow for classification of individuals based on some attribute or characteristic
- Quantitative Variables = provide numerical measures of individuals. Math operations such as addition and subtraction can be performed and provided meaningful results.

7. Classify the variable as qualitative or quantitative (Similar to p.11 #15-22)

Hair color

8. Classify the variable as qualitative or quantitative (Similar to p.11 #15-22)

Number of pets

9. Classify the variable as qualitative or quantitative (Similar to p.11 #15-22)

Social Security Number

10. Classify the variable as qualitative or quantitative (Similar to p.11 #15-22)

Assessed value of a car

Definitions

- Discrete Variable = a quantitative variable that has either a finite number of possibilities or a countable number of variables "No Decimals"
- Continuous Variable = a quantitative variable that has an infinite number of possible values that are not countable "Has Decimals"

11. Determine whether the quantitative variables is discrete or continuous (Similar to p.11 #23-30)

Amt of oil in a car at any given time

12. Determine whether the quantitative variables is discrete or continuous (Similar to p.11 #23-30)

Number of deer in a forest

13. Determine whether the quantitative variables is discrete or continuous (Similar to p.11 #23-30)

Age of a Student

14. Determine whether the quantitative variables is discrete or continuous (Similar to p.11 #23-30)

Temperature of the water in a swimming pool

Definitions

- Individuals: a person or object that is a member of the population being studied
- Variables: The characteristics of the individuals within the population
- Data: Describes characteristics of an individual

15. Identify the individuals, varaibles, and data corresponding to the variables. Determine whether each variable is qualitative, continuous, or discrete (Similar to p.12 #45-48)

Name	Hair Color	Age	Weight
Sam	Black	33	250
Sally	Red	21	120
Bill	Brunette	20	130.5

Levels of Measurements of a Variable

- Nominal level of measurement: name, label or categorize (hair color)
- Ordinal level of measurement: properties of nominal but you can arrange by rank or order (car size)
- Interval level of measurement: properties of ordinal and the differences in the values of the variable have meaning (year of birth). Addition and Subtraction are ok.

Levels of Measurements of a Variable (continued)

- Ratio level of measurement: same properties of interval and the ratios of the values of the variable have meaning. Zero in this measurement means absence of the quantity. Multiplication and division can be performed at this level (value of a car)

16. Determine the level of measurement of each variable (Similar to p.12 #31-38)

Color of a car

17. Determine the level of measurement of each variable (Similar to p.12 #31-38)

Class in high school (freshman, sophomore, junior, senior)

18. Determine the level of measurement of each variable (Similar to p.12 #31-38)

Year of graduation

19. Determine the level of measurement of each variable (Similar to p.12 #31-38)

Weight of students