

Ch 1.1 Key Terms and Introduction

Ch 1.1 Definitions of statistics and probability key terms.

Statistics is the science of collecting, analyzing, interpreting and presenting data.

Two main branches of statistics:

- descriptive statistics: organizing and summarizing data.
- Inferential statistics: Draw conclusion from data.

Why should we study statistics?

- To be able to read and understand various statistical studies performed in their fields—requires a knowledge of the vocabulary, symbols, concepts, and statistical procedures
- To conduct research in their fields—requires ability to design experiments which involves collection, analysis, and summary of data.
- To become better consumers and citizens.

Probability: A tool to study randomness, it deals with the chance of an event occurring. Rare event rule is used to draw conclusion from data. An event is “significant” if it has 5% or lower chance of occurring.

Terms: Population vs sample

Population: the target group of person, things, or objects under study. It takes times and money to study the entire population.

Sample: A subset of the larger population to gain information about the population. (A census is a collection of data from every member of the population.)

Terms: Parameter vs Statistic

Parameter: A numerical characteristic of the population.

Statistic: A numerical characteristic of a sample. The value varies from sample to sample.

Sample is collected so we can use the statistic to estimate the corresponding parameter of the population. Sample must be representative to give an accurate estimation of the parameter.

Ex. Use sample mean (average) to predict population mean. Use sample proportion to predict population proportion.

Terms: Variable and Data

Variable: a characteristic or measurement for each member of the population.

Data: the actual values of the variables.

Ex 1.

a) 37 students are randomly selected to find the proportion of students who prefer asynchronous mode of teaching.

What is the population? all students.

What is the sample? The 37 students selected.

b) Of the 37 students surveyed, 14% prefer asynchronous teaching.
The number 37% is a parameter or statistic?

c) The average annual income for all residents in a city is \$34,000.
The number \$34,000 is a parameter or statistic? parameter.

d) A sample of 45 college graduates are surveyed and their average annual income is \$34,000.
The number \$34,000 is a parameter or statistic? statistics.

Ex 2. Determine what the key terms refer to in the following study.

A study was conducted at a local college to analyze the average cumulative GPA's of students who graduated last year by surveying a randomly selected group of students who graduated last year.

- a) Cumulative GPA of a student who graduated last year. _____ variable
- b) Cumulative GPA of a sample of students graduated last years are: 3.65, 2.80. 1.5, 3.9. _____ data
- c) The group of students being surveyed. _____ sample
- d) College Registrar published that average cumulative GPA of all students who graduated from the college last year is 3.1. _____ parameter
- e) All students graduated last year in the local college. _____ population
- f) Average cumulative GPA from the sample of students is 3.32 _____ statistics

Ex 3. A study on car safeties are performed. A sample of 75 cars with dummies in the front seats were crashed into a wall at a speed of 35 miles per hour. We want to know the proportion of dummies in the driver's seat that would have had head injuries, if they had been actual drivers. For each car crash, the head injury condition (yes or no) of the dummy is recorded.

- a) Population is _____ all cars
- b) sample is _____ 75 cars
- c) Parameter is _____ head injuries percent from all cars.
- d) Statistics is _____ head injuries percent from the sample of 75 cars.
- e) Variable is _____ Injury conditions for the dummies.
- f) Data is _____ yes, no of head injuries

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