**Chapter 1**

**What Is Statistics?**

1. a. Interval b. Ratio

 c. Nominal d. Nominal

 e. Ordinal f. Ratio **(LO1-5)**

2. a. Ratio b. Nominal

 c. Ratio d. Ratio **(LO1-5)**

3. Answer will vary. **(LO1-5)**

4. a. Sample b. Population

 c. Population d. Sample **(LO1-3)**

5. Qualitative data is not numerical, whereas quantitative data is numerical. Examples will vary by student. **(LO1-4)**

6. A population is the entire group which you are studying. A sample is a subset taken from a population. **(LO1-3)**

7. Discrete variables can assume only certain values, but continuous variables can assume any values within some range. Examples will vary. **(LO1-4)**

8. a. A population is used because the professor likely has grades readily available from every student over the past 5 years.

 b. A population is employed because the information is easy to find.

 c. A population is used because the information is easy to find.

 d. A sample works because it is difficult to locate every musical. **(LO1-3)**

9. a. Ordinal

 b. Ratio

 c. The newer system provided information on the distance between exits. **(LO1-5)**

10. The cell phone provider is nominal level data. The minutes used are ratio level. Satisfaction is ordinal level. **(LO1-5)**

11. If you were using this store as typical of all Barnes & Noble stores then it would be sample data. However, if you were considering it as the only store of interest, then the data would be population data. **(LO1-3)**

12. In a presidential election all votes are counted, thus it is similar to a census of the entire population. However, an “exit” poll consists of only some voters and thus is more like a sample of the entire population. **(LO1-3)**

13.

|  |  |  |
| --- | --- | --- |
|  | Discrete | Continuous |
| Qualitative | b. Genderd. Soft drink preferenceg. Student rank in classh. Rating of a finance professor |  |
| Quantitative | c. Sales volume of MP3 playersf. SAT scoresi. Number of home computers | a. Salarye. Temperature |

|  |  |  |
| --- | --- | --- |
|  | Discrete | Continuous |
| Nominal | b. Gender |  |
| Ordinal | d. Soft drink preferenceg. Student rank in classh. Rating of a finance professor |  |
| Interval | f. SAT scores | e. Temperature |
| Ratio | c. Sales volume of MP3 playersi. Number of home computers | a. Salary |

 **(LO1-4 and LO1-5)**

14. Answers will vary. **(LO1-5)**

15. As a result of these sample findings, we can conclude that 120/300 or 40% of the white-collar workers would transfer outside the U.S. **(LO1-3)**

16. The obvious majority of consumers (400/500, or 80%) believe the policy is fair. On the strength of these findings, we can anticipate a similar proportion of all customers to feel the same. **(LO1-3)**

|  |  |
| --- | --- |
| Manufacturer | Difference |
| General Motors Corp. | 128,133 |
| Chrysler | 126,955 |
| Ford Motor Company | 112,975 |
| Toyota Motor Sales USA Inc. | 96,078 |
| Nissan North America Inc. | 72,146 |
| Subaru of America Inc. | 61,834 |
| American Honda Motor Co Inc. | 38,440 |
| Kia Motors America Inc. | 36,313 |
| Hyundai Motor America | 30,656 |
| Mercedes-Benz | 20,187 |
| Audi of America Inc. | 18,970 |
| Mitsubishi Motors N A, Inc. | 16,119 |
| Land Rover | 13,535 |
| BMW of North America Inc. | 12,202 |
| Mazda Motor of America Inc. | 7,407 |
| Volvo | 5,980 |
| Mini | 4573 |
| Porsche Cars NA Inc. | 4,337 |
| Tesla | 1,850 |
| Lamborghini | 372 |
| Ferrari | 164 |
| Rolls Royce | 19 |
| Bentley | -351 |
| Jaguar | -633 |
| Maserati | -783 |
| Smart | -2,512 |
| Fiat | -3,650 |
| Volkswagen of America Inc. | -6,585 |

17. a.

b. Percentage differences with top five and bottom five.

|  |  |
| --- | --- |
| **Manufacturer** | **% change from 2014** |
| Lamborghini  | 75% |
| Land Rover  | 32% |
| Mitsubishi Motors N A, Inc. | 25% |
| Subaru of America Inc. | 15% |
| Audi of America Inc. | 13% |
| Volvo | 13% |
| Tesla  | 12% |
| Porsche Cars NA Inc. | 11% |
| Mini  | 10% |
| Ferrari  | 9% |
| Chrysler | 8% |
| Kia Motors America Inc. | 7% |
| Mercedes-Benz | 7% |
| Nissan North America Inc. | 6% |
| Ford Motor Company | 5% |
| General Motors Corp. | 5% |
| Hyundai Motor America | 5% |
| Toyota Motor Sales USA Inc. | 5% |
| BMW of North America Inc. | 5% |
| American Honda Motor Co Inc. | 3% |
| Mazda Motor of America Inc. | 3% |
| Rolls Royce  | 3% |
| Volkswagen of America Inc. | -2% |
| Jaguar  | -5% |
| Maserati  | -8% |
| Fiat | -9% |
| Bentley  | -15% |
| Smart  | -29% |

c. **(LO1-2)**

18. The total amount spent is $603.86. The percents by group are: 75, 14, 4, and 7, respectively. **(LO1-2)**

19. Earnings increase about $3 billion per year over the period. However 2008 sees a very large increase and 2009 sees a large decrease.

 Perhaps the earnings were affected by the financial “collapse” during the years 2008-2010.

 Perhaps $15 billion of 2008 earnings were somehow “advanced” from the next year or two?

 **(LO1-2)**

20. a. Qualitative variables: Pool, Garage, Township, Mortgage type, Default

Quantitative variables: Price, Bedrooms, Size, Baths, FICO Years **(LO1-4)**

b. Price measured in dollars: Continuous, Ratio scale

Agent: Nominal

Bedrooms are counted: Discrete, Ordinal??? Ratio scale

Size measured in area of square feet: Contiguous, Ratio scale

Pool measured as present or not: nominal

Garage measured as present or not: nominal

Baths are counted: Discrete, Ordinal?? Ratio scale

Township is labeled: nominal

Mortgage type measures as adjustable or fixed: nominal

FICO is an index of a person’s ability to pay their bills: ratio

Years are counted: ordinal

Default: measured as yes or no: nominal **(LO1-5)**

21. a. League is a qualitative variable; the others are quantitative. **(LO1-4)**

 b. League is a nominal level variable; the others are ratio level variables. **(LO1-5)**

22. a. Bus Number, Manufacturer, and engine type are qualitative variables, the others are quantitative. **(LO1-4)**

b. Bus Number, Manufacturer, and Engine Type nominal level variables; the others are ratio level variables. **(LO1-5)**