Practice Test 1

Sampling And Data

Last Name	First Name	Date

This assignment is closed books. One 2-sided US Letter sheet of notes is OK.

All your scratch work will be collected with the test and discarded.

All electronic devices besides approved calculators and computers running approved software are prohibited.

Avoid rounding during computation as much as possible. Final answers should be rounded to no fewer than 4 significant digits.

1 (10 points)**.** A coffee shop chain is interested in estimating the average temperature of coffee served in to-go cups. A systematic sample of ready-to-serve coffee cups is taken throughout the day, and the temperature of each cup is measured.

Describe each of the following:

(1) **individual** (a member of the population to be measured or examined)

(2) **population(s)** (collection(s) of individuals of interest)

(3) **parameter/statistic** (numerical summary derived from the population/sample)

(4) **variable(s)** (what is being measured?)

(5) **data** (give 2 or 3 examples of an individual measurement)

2 (10 points)**.** A political party wants to find the proportion of California residents who favor decriminalization of drug use. The pollster creates a random list of mobile phone numbers, calls each one, and offers to participate in the study by stating one's preference for or against legalization.

Describe each of the following:

(1) **individual** (a member of the population to be measured or examined)

(2) **population(s)** (collection(s) of individuals of interest)

(3) **parameter/statistic** (numerical summary derived from the population/sample)

(4) **variable(s)** (what is being measured?)

(5) **data** (give 2 or 3 examples of an individual measurement)

3 (14 points)**.** For each variable, determine whether it's *qualitative* or *quantitative*. For each qualitative variable determine whether it's *nominal* or *ordinal*. For each quantitative variable determine whether it's *discrete* or *continuous*, and whether it's *interval* or *ratio*.

(a) Official language of a country

(b) Melting temperature of a metal in $^{\circ}$F

(c) Letter grade in a statistics class at a community college

(d) The height of a tree in inches

(e) Number of attendees at a dinner party

(f) Price of a donut

(g) Eye color

4 (8 points)**.** Describe the stages and the types of sampling (simple random, systematic, stratified, cluster, convenience) involved in the following multistage sampling scenarios:

(a) To take a sample of houses in Sacramento, a researcher picks 10 streets at random, and then samples every 5th house on each of the chosen streets.

(b) To obtain a sample trees in a national forest, a ranger splits the forest into 100 geographical areas of roughly equal size, and selects 12 areas at random. In each selected area, the ranger takes a sample consisting of 10 evergreens and 10 deciduous trees. To choose the individual trees, she travels to each selected area and samples whatever trees she finds upon the arrival.

5 (4 points)**.** A statistician wants to know the proportion of "early birds" among Sacramento residents. At 5:30 AM on a Sunday, he calls 40 random phone numbers in the Sacramento area and asks each respondent whether they feel fully awake.

Discuss possible sources of bias in this sampling procedure. What kind of individuals are more likely to be sampled than others, and how will that affect the responses?

6 (4 points)**.** Amara is a social media influencer with a popular channel dedicated to exercise and body care. She creates a poll for her viewers, available for anyone who wants to participate. Each participant is asked to rate, on the scale from 1 to 5, their own personal hygiene.

Discuss possible sources of bias in this sampling procedure. What kind of individuals are more likely to be sampled than others, and how will that affect the responses?

TOTAL POINTS: 50