Equitable Equations: *Introduction to statistical sampling*

Problem 1

Identify the sampling technique used in each of the following. If applicable, identify possible sources of sampling bias.

(a) Following an earthquake in San Francisco, a relief agency selects forty city blocks at random and then sends agents door-to-door to assess damage.

(b) A corn field is divided into 25 one-acre plots and a random sample is taken from each one to estimate crop yield.

(c) From an alphabetical list of customers, a car dealership sends satisfaction surveys to every tenth person.

(d) A student gathers data on satisfaction with a school's cafeteria by surveying all of their friends and carefully recording answers in a numerical spreadsheet.

(e) At a basketball game, ten seats are chosen at random and the occupants given prizes.

Problem 2

The following problem is taken from *OpenIntro Statistics*, Fourth Edition, by David Diez, Mine Çetinkaya-Rundel, and Christopher Barr. Pay what you want or download for free at `https://www.openintro.org/book/os/`

1.23 Evaluate sampling methods. A university wants to determine what fraction of its undergraduate student body support a new \$25 annual fee to improve the student union. For each proposed method below, indicate whether the method is reasonable or not.

(a) Survey a simple random sample of 500 students.

(b) Stratify students by their field of study, then sample 10% of students from each stratum.

(c) Cluster students by their ages (e.g. 18 years old in one cluster, 19 years old in one cluster, etc.), then randomly sample three clusters and survey all students in those clusters.

Equitable Equations: *Frequency distributions*

Problem 1

The following frequency distribution shows waiting times, in seconds, for customers at a fast-food restaurant.

Class	Frequency
$[0, 90)$	19
$[90, 180)$	15
$[180, 270)$	8
$[270, 360)$	5
$[360, 450)$	3

Expand this table to include class midpoints, relative frequencies, and cumulative frequencies. Sketch a rough histogram representing this data.