



ANSWER BOOK

Sampling and the large data set

Statistics · Year 12–13

7 questions · 20 marks

NAVY EDITION

SECTION A · Warm-up

- A1** The population is every member of the group under study; a census measures all of them; a sample measures a chosen subset and uses it to say something about the whole. The census is complete but expensive; the sample trades completeness for practicality. [2]
- A2** A sampling frame: a numbered list of the whole population. Then every member must have an equal chance of selection, and every possible sample of that size must be equally likely, which random numbers deliver and convenience never does. [2]

SECTION B · Standard

- B1** The fractions come first: first years supply $50 \times 720/1200 = 30$ students, second years $50 \times 480/1200 = 20$. Then, within each year group, number the students and take a simple random sample of the required size. Both parts earn marks: the proportional arithmetic, and the random selection inside each stratum. [50]
- B2** The interval is $1200/60 = 20$. Pick a random starting point from 1 to 20, then take every 20th name from there. The random start is what keeps the method fair; starting at 1 every time would not be. [3]
- B3** Stratification guarantees the sample's year-group mix matches the college's 60:40 split. A simple random sample only matches it on average: one unlucky draw could badly over-represent a year group, and any year-group comparison made from it would inherit the distortion. [3]

SECTION C · Stretch

- C1** Opportunity (convenience) sampling: whoever happens to be available. The 7 am gym crowd exercises more than the population it is meant to represent, so every estimate drawn from it leans the same way. Ease of collection is the method's only virtue. [1]
- C2** The sampling frame excludes exactly the people the survey most needs: those with poor or no internet access cannot answer. The responses will overstate reliability, and no sample size fixes it, because the missing group is missing systematically, not randomly. [3]