

5 Sampling variability – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

sampling distribu-
tion

Recall

You know a sample is used to estimate a whole population:

- But two different samples will give slightly different answers.
- The sample mean is not exactly the true mean – it varies.

This sheet lines up how sample results vary. Each idea has a worked example.

New ideas

■ 1 Statistics vary

A **statistic** (like a sample mean) changes from one sample to the next, just by chance. This is **sampling variability**.

■ 2 The sampling distribution

The **sampling distribution** is the distribution of a statistic over many, many samples – it shows how much the statistic bounces around.

■ 3 Centered on the truth

For a fair sample, the sampling distribution is **centered** on the true population value – so on average, the sample gives the right answer.

■ 4 Bigger samples, less spread

Worked example. Estimating an average with a sample of 100 gives a much less variable result than a sample of 10 – larger samples give more reliable estimates.

Watch out: the sample mean is almost never **exactly** equal to the population mean – it varies by chance. What we can say is how **close** it is likely to be, and larger

samples make it closer.

Practice

Try these in order. The methods are all above.

2.1 State what “sampling variability” means. [2]

2.2 State what a sampling distribution shows. [2]

2.3 State where the sampling distribution of a fair sample is centered. [1]

2.4 State the effect of a larger sample on the variability of an estimate. [2]

2.5 Explain why two different samples from the same population can give different means. [2]
