5 The central limit theorem – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
central limit theorem	中心极限定理	

Recall

In Part A you saw that sample means vary. There is a beautiful pattern to how they vary:

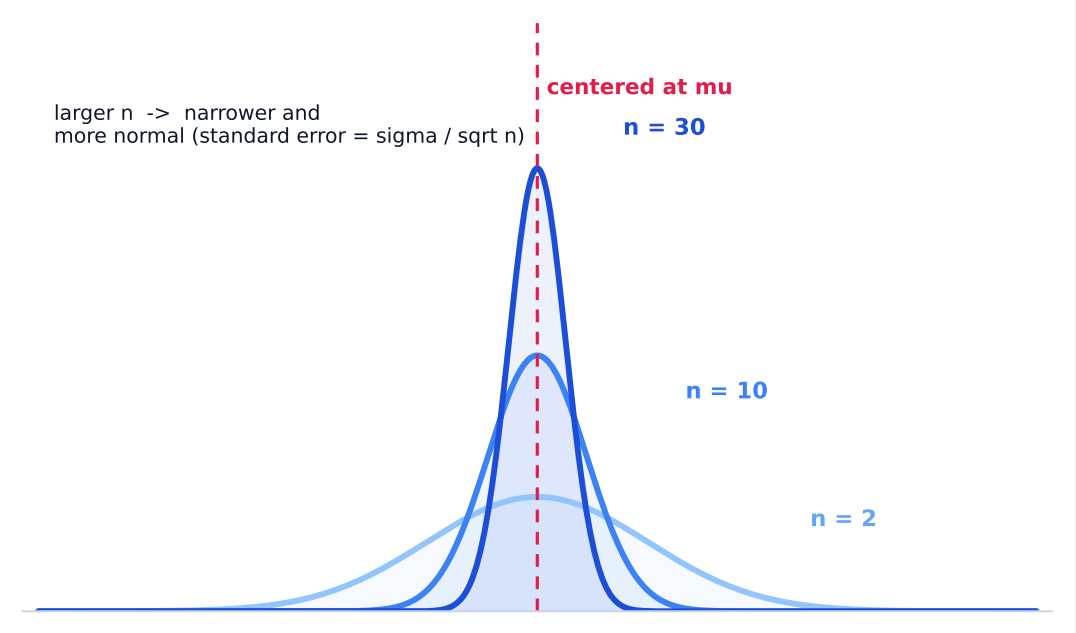
- Even if the original data are not bell-shaped, the sample means often are.
- This pattern is the key that makes statistics work.

Each idea has a worked example before the Practice.

New ideas

■ 1 The central limit theorem

The **central limit theorem** 中心极限定理 says: for a large enough sample, the distribution of the **sample mean** is approximately **normal** (bell-shaped), centered on the population mean.



2 Even from non-normal data

Remarkably, this holds **even if the original population is not normal** –the averaging smooths things into a bell shape.

3 Larger samples, tighter bell

The bigger the sample, the narrower and more normal the distribution of the sample mean becomes.

4 Why it matters

Because the sample mean is approximately normal, we can use the familiar bell curve (and the 68–95–99.7 rule) to say how confident we are in an estimate –the basis of all the inference that follows.

Watch out: the central limit theorem is about the distribution of the **sample mean**, not the individual data. The raw data can be skewed while the sample means are still bell-shaped.

Practice

Try these in order. The methods are all above.

2.1 State what the central limit theorem says about the sample mean. [2]

2.2 State the surprising part –what it does not require of the population. [2]

2.3 State what happens to the sample mean's distribution as the sample gets larger. [2]

2.4 State why the central limit theorem is so useful in statistics. [2]

2.5 State whether the theorem is about the individual data or the sample mean. [1]