

Exercise walk-through

Introducing Statistics: Why Be Normal? ■ 6.1

eXercise

You must be able to

- explain that the **normal** 正态 approximation underlies inference for proportions
- state the **large counts condition** 大计数条件
- describe what inference estimates from a sample

Method — Why normal?

Because the sampling distribution of $\hat{p}$ is approximately **normal** (when conditions are met), we can use z-values to build confidence intervals and run tests about a population proportion.

Method — The large counts condition

The normal model applies when $np \geq 10$ **and** $n(1 - p) \geq 10$. Inference then uses the sample to estimate the unknown population proportion p .

Practice 2.1 ■ 1 mark

State why the normal distribution is central to inference for proportions.

Solution 2.1

Worked steps

the sampling distribution of $\hat{p}$ is approximately normal, allowing z-based inference **B1**.

Practice 2.2 ■ 1 mark

State the large counts condition for a proportion.

Solution 2.2

Method: The large counts condition

Worked steps

$np \geq 10$ and $n(1 - p) \geq 10$ **B1**.

Practice 2.3 ■ 1 mark

State what inference uses a sample to estimate.

Solution 2.3

Method: The large counts condition

Worked steps

the unknown population proportion p **B1**.

Exam-style 3.1 ■ 1 mark

Inference for proportions relies on the _____ distribution.

A binomial

B normal

C uniform

D skewed

Solution 3.1

A binomial

B normal 

C uniform

D skewed

Worked steps

B.

Exam-style 3.2 ■ 1 mark

The large counts condition requires np and $n(1 - p)$ to each be at least

A 1

B 5

C 10

D 30

Solution 3.2

Method: The large counts condition

A 1

B 5

C 10



D 30

Worked steps

C.

Exam-style 3.3 ■ 1 mark

A sample proportion is used to estimate a population proportion.

- (a) Name the distribution used for inference.
- (b) State the condition for it to apply.
- (c) State what we are estimating.

Solution 3.3

Method: The large counts condition

Worked steps

(a) the normal distribution **B1**. (b) $np \geq 10$ and $n(1 - p) \geq 10$ **B1**. (c) the population proportion p **B1**.