

6 Continuous variables and testing – 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)
continuous random variable	连续型随机变量	_____
probability density function	概率密度函数	_____
hypothesis test	假设检验	_____
null hypothesis	原假设	_____
rejection region	拒绝域	_____

Recall

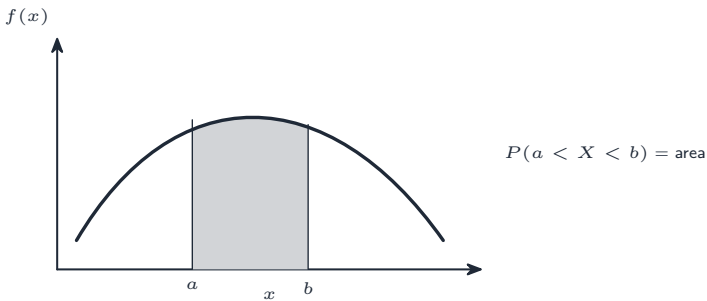
A continuous variable can take any value in a range, and a hypothesis test judges a claim from data.

New ideas

Read these first, then do the Practice.

■ 1 Continuous random variables

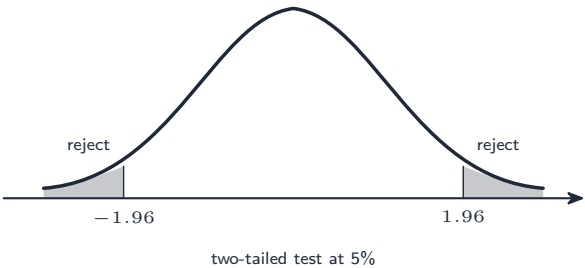
A **continuous random variable** 连续型随机变量 has a **probability density function** 概率密度函数 $f(x)$. A probability is the **area** under the curve:



$$P(a < X < b) = \int_a^b f(x) dx, \quad \int_{-\infty}^{\infty} f(x) dx = 1$$

■ 2 Hypothesis tests

A **hypothesis test** 假设检验 tests the **null hypothesis** 原假设 H_0 against the alternative H_1 . You reject H_0 if the test statistic lands in the **rejection region** 拒绝域:



Watch out: for a pdf, the *total area* = 1, and a probability is the *area* under the curve (an integral). Reject H_0 only if the test statistic lands in the *rejection region*; a two-tailed 5% test uses ± 1.96 .

Practice

Try these in order.

6.6 For a probability density function $f(x)$, what must the total area equal? [1]

6.7 On a density curve, what does the area between $x = a$ and $x = b$ represent? [1]

6.8 In a hypothesis test, what is the null hypothesis usually? [1]

6.9 When do you reject the null hypothesis? [1]

6.10 A two-tailed test at 5% rejects H_0 if the test statistic is beyond what value? [1]

6.11 Challenge. A continuous random variable has $f(x) = kx$ for $0 \leq x \leq 2$ (and 0 elsewhere). Find the value of k . [3]