

# 1 The normal distribution – Part 2

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Vocabulary 词汇

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

| English | 中文        | Write it 3 times (English) |
|---------|-----------|----------------------------|
| normal  | distribu- | 正态分布                       |
| tion    |           |                            |

## Recall

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In Part A you described data's center, spread, and shape. Now one very common shape:

- Many things (heights, test scores) pile up in a “bell” shape.
- Most values are near the middle, with fewer far out.

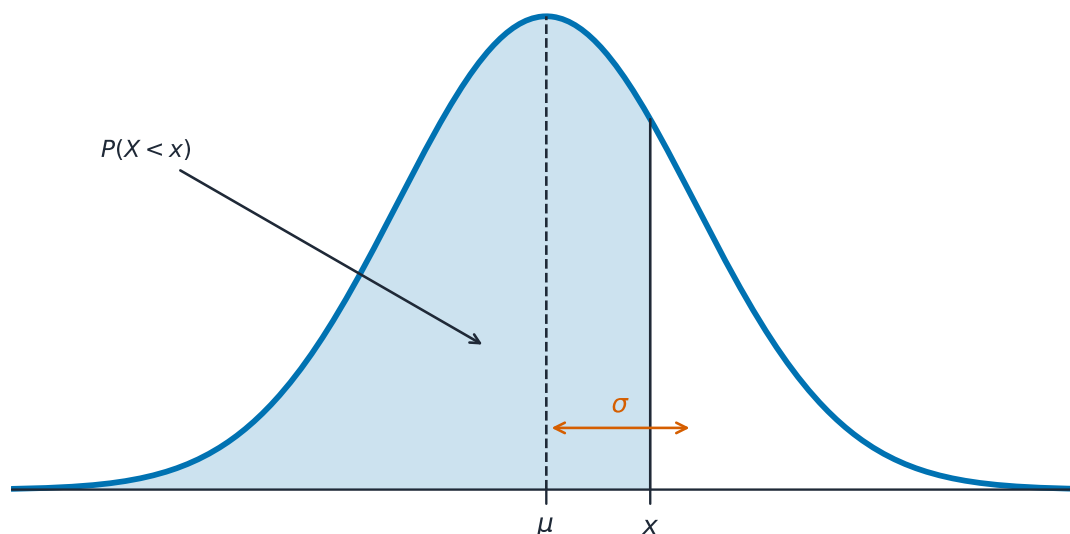
Each idea has a worked example before the Practice.

## New ideas

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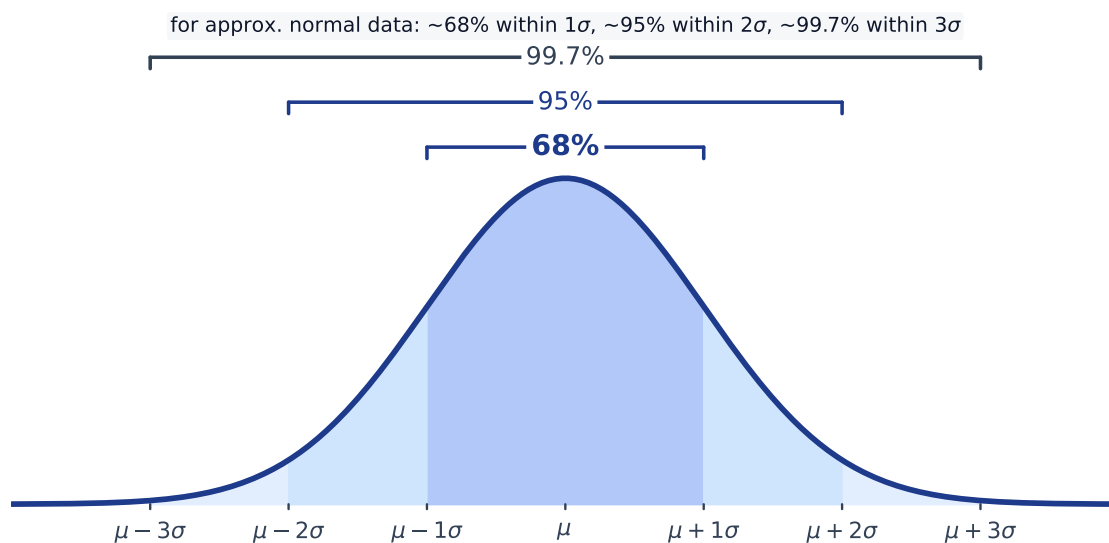
### ■ 1 The normal distribution

A **normal distribution** 正态分布 is the classic **bell curve** – symmetric, with most data near the mean and less as you move away.



## ■ 2 The empirical rule

For a normal distribution, the **empirical rule** (the 68–95–99.7 rule) says:



- about **68%** of values lie within 1 standard deviation of the mean,
- about **95%** within 2 standard deviations,
- about **99.7%** within 3.

## ■ 3 Using the rule

*Worked example.* Test scores are normal with mean 100 and standard deviation 10. Then about 95% of scores lie between  $100 - 2(10) = 80$  and  $100 + 2(10) = 120$ .

#### ■ 4 Why it matters

The bell curve appears so often that these percentages let you quickly judge how unusual a value is.

**Watch out:** the 68–95–99.7 rule only applies to a **normal** (bell-shaped) distribution. For skewed data it does not hold – always check the shape first.

### Practice

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Try these in order. The methods are all above.

**2.1** Describe the shape of a normal distribution. [2]

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**2.2** State the three percentages of the empirical rule. [3]

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**2.3** Heights are normal with mean 170 cm and standard deviation 8 cm. State the range that holds about 68% of people. [2]

**2.4** For the same heights, state the range that holds about 95%. [2]

**2.5** State when the empirical rule does not apply. [1]

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