

1 The normal distribution – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

*Write each word three times.***English****Write it 3 times** (English)normal distribu-
tion

Recall

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

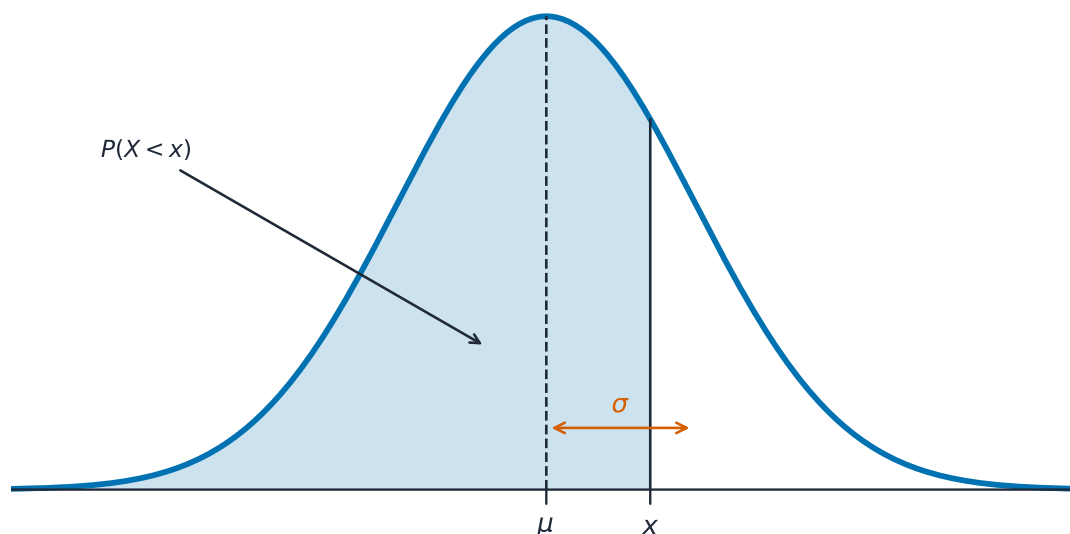
- Many things (heights, test scores) pile up in a “bell” shape.
- Most values are near the middle, with fewer far out.

Each idea has a worked example before the Practice.

New ideas

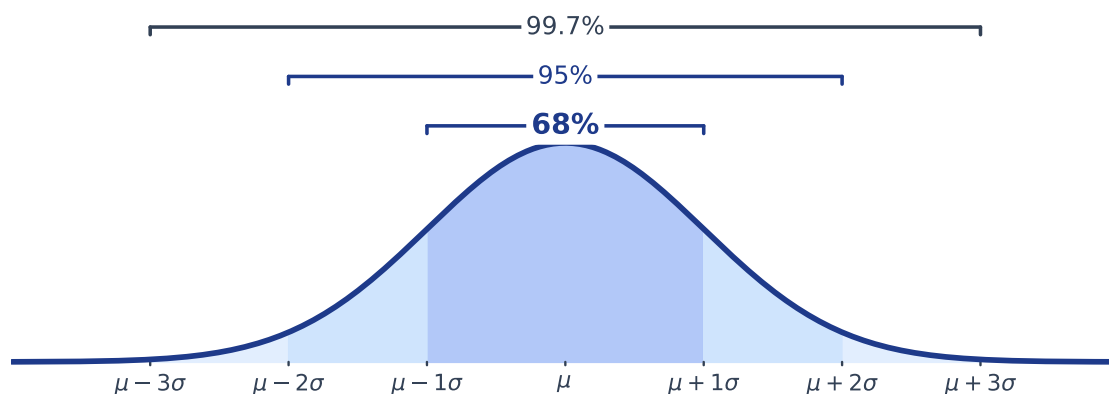
■ 1 The normal distribution

A **normal distribution** 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:



for approx. normal data: ~68% within 1σ , ~95% within 2σ , ~99.7% within 3σ

- 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

Try these in order. The methods are all above.

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

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

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]
