Why Do We Multiply the IQR by 1.5?

We multiply the Interquartile Range (IQR) by 1.5 to find the "fences" or boundaries beyond which a value is considered an outlier.

What the IQR Represents

- The IQR is the middle 50% of the data ->from Q1 to Q3
- It shows the range where most "normal" values lie

What 1.5 × IQR Does

Multiplying IQR by 1.5 is a standard statistical rule (introduced by John Tukey) that gives us a buffer zone beyond the middle 50%. This is how we check if a number is too far from normal.

$$\textbf{Lower Bound} = Q1 - 1.5 \times IQR$$

$$\textbf{Upper Bound} = Q3 + 1.5 \times IQR$$

Any number outside this range is far enough to be called an outlier.

Why 1.5 Exactly?

1. **It's a rule of thumb that works well for most data**
    - Not too strict (like 1.0)
    - Not too loose (like 3.0)
2. **Captures most "normal" data**
    - In many datasets, using 1.5 × IQR includes about 99% of values.
3. **Works without assuming normal distribution**
    - It's a non-parametric method -> doesn't care about bell curves or standard deviation.

Example:

A classroom test scores:

- Most students score between 60 and 90 → that's IQR
- But someone scores 20 or 100 — that's far from the usual range

Using **1.5 × IQR** sets a reasonable range to say:
This is too far from the rest, let's call it an outlier.