Box Plots: The Five-Number Summary

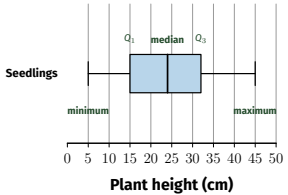
Key idea

A box plot marks the **minimum**, Q_1, **median**, Q_3, and **maximum**.

Four quartile intervals

Each interval contains about 25% of the data. The box contains the middle 50%.

Anatomy of a box plot



= copy. No pencil = read or discuss.

Read Values from the Scale

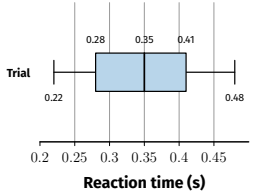
Key idea

Use the numbered scale and units. Estimate between ticks only as accurately as the scale allows.

Reaction time

Five-number summary (s): $(0.22,\ 0.28,\ 0.35,\ 0.41,\ 0.48)$.

Read down to the axis



= copy. No pencil = read or discuss.

Range and Interquartile Range

Key idea

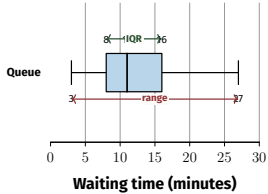
range = maximum − minimum. IQR = $Q_3 - Q_1$. The IQR measures the spread of the middle 50%.

Queue waiting time

Range = $27 - 3 = 24$ min.

IQR = $16 - 8 = 8$ min.

See both spreads



= copy. No pencil = read or discuss.

Interpret Centre and Spread

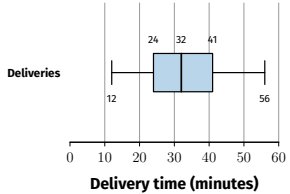
Key idea

The median splits ordered data in half: about 50% lies on each side.

Delivery times

Median $= 32$ min. The middle 50% spans 24 to 41 min, so IQR $= 17$ min.

Centre plus middle spread



= copy. No pencil = read or discuss.

Equal Proportions, Unequal Lengths

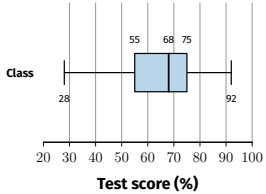
Key idea

Each quartile interval holds about 25%, even when its numerical length differs.

Test scores

68–75 is concentrated. Longer lower intervals suggest a left tail.

Same proportion, different width



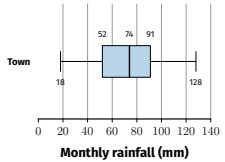
= copy. No pencil = read or discuss.

A Complete Interpretation

Rainfall summary

Median $= 74$ mm. The middle 50% is 52 to 91 mm, so IQR $= 39$ mm. Range $= 128 - 18 = 110$ mm. The longer lower whisker suggests more spread below Q_1.

Support every claim



Common mistake

The box is the middle 50%, not all data. Median is not mean; longer does not mean more data.

= copy. No pencil = read or discuss.