GCSE ONLINE TUTORING

STATISTICS / TOPIC GUIDE 60

60

Histograms, cumulative frequency and box plots

Core comparison skills with Higher statistical diagrams

Read distributions rather than just isolated numbers. Build frequency polygons and histograms, recover counts from area, estimate quartiles from cumulative frequency and compare box plots. Higher sections make the assumptions behind grouped-data calculations explicit.

Frequency = class width × frequency density

Histograms use area; cumulative graphs use totals.

UNDERSTAND THE IDEA. EXPLAIN THE METHOD.

Detailed teaching • Worked examples • Discussion • Original practice • Full solutions

Name: _____

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Your learning guide

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Before you begin

Use grouped tables, class boundaries, midpoints, medians and quartiles. Have a ruler and separate squared paper for diagram construction.

Your route through this notebook

1. Frequency polygons and continuous class boundaries
2. Histograms: frequency is represented by area — Higher
3. Missing histogram scales and relative areas — Higher
4. Cumulative frequency and estimating percentiles — Higher
5. Box plots and comparing distributions

How to use it

Read a lesson, cover the worked solutions and try the examples yourself. Complete its practice page before checking the answers at the back. Finish with the mixed review, then return to any method you could not explain.

YOUR PROGRESS

After each lesson, ask: Can I explain the idea? Can I choose a method? Can I check my result? Record any questions you want to revisit.

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LESSON 1 / UNDERSTAND

Frequency polygons and continuous class boundaries

A frequency polygon displays a grouped frequency distribution by plotting each class midpoint against its frequency and joining successive points with straight line segments. Use midpoint on the horizontal axis and frequency on the vertical axis. A midpoint represents the whole interval; it is not a measured observation. For straightforward comparisons, use the same class boundaries and frequency scale for both groups, or state a suitable relative-frequency scale if group sizes differ.

Continuous measurements need correct class boundaries. A measurement rounded to the nearest centimetre and recorded as 10 through 19 cm corresponds to underlying lengths $9.5 \leq l < 19.5$ cm under the usual rounding model. By contrast, a table already specified as $10 \leq l < 20$ has boundaries 10 and 20. Do not automatically subtract 0.5 from every printed boundary: first determine whether the labels are rounded integer values or explicit measurement intervals.

Equal-width classes make polygon shape comparisons easier. With unequal widths, frequency alone can obscure concentration per unit; a histogram using density is often more suitable. A polygon and a cumulative-frequency curve show different vertical quantities: ordinary frequency in one class versus total frequency up to a boundary. Check the axis before interpreting either.

A reliable method

1. Determine the actual class boundaries and calculate midpoints.
2. Plot (midpoint, frequency) on labelled axes and join consecutive points.
3. Compare like-for-like scales and distinguish a class count from a cumulative count.

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LESSON 1 / WORKED EXAMPLES

See the method in action

Try each example in the space provided before reading its solution. Explain why the method fits the question, not just which calculation to enter.

Worked example 1

Classes [0, 10), [10, 20), [20, 30) have frequencies 4, 8, 8. State frequency-polygon points.

STEP-BY-STEP SOLUTION

Midpoints are 5, 15, 25. Plot (5, 4), (15, 8), (25, 8) and join them. The points are at midpoints, not at the upper boundaries 10, 20, 30.

Worked example 2

Lengths rounded to the nearest centimetre are recorded in classes 10–19, 20–29, 30–39 cm. State continuous boundaries and midpoints.

STEP-BY-STEP SOLUTION

Use 9.5–19.5, 19.5–29.5, 29.5–39.5 cm, with the upper boundary excluded in each interval. Midpoints are 14.5, 24.5, 34.5 cm. These differ from intervals explicitly defined as [10, 20), [20, 30), [30, 40).

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LESSON 1 / DISCUSS & PRACTISE

Explain it, then try it

DISCUSSION • TEST THE IDEA

The line joining midpoints is a display of grouped frequencies, not a claim that fractional numbers of individuals were actually observed between the classes.

Say it in your own words

Explain the key idea to someone else. Use a small example to support your explanation. If you disagree with a claim, show why it fails.

1.1 Find midpoints for [0, 4), [4, 8), [8, 12).

1.2 Those classes have frequencies 3, 7, 5. State polygon coordinates.

1.3 Masses rounded to the nearest gram are grouped as 20–29 g. State underlying class boundaries.

1.4 Why can comparing raw frequency polygons for samples of 20 and 200 be misleading?

Check before turning to the answers: is the size sensible, is the notation clear, and have you included any required units?

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LESSON 2 / UNDERSTAND

Histograms: frequency is represented by area — Higher

A histogram represents grouped continuous data with adjacent bars on a numerical horizontal scale. Each bar spans its actual class interval. Frequency is proportional to bar area, so when the vertical axis is frequency density, density = frequency/class width and frequency = density × class width. With unequal widths, drawing heights equal to frequencies would give wide classes too much visual area.

For a class [10, 30) with frequency 40, width is 20 and density 2. For [30, 40) with frequency 30, width is 10 and density 3. The narrower second bar is taller, yet contains fewer observations. The tallest histogram bar indicates the greatest frequency per unit of x, not necessarily the largest class frequency. Include density units conceptually: for journey time, density has units of observations per minute.

To estimate a count within part of a class, use the relevant fraction of its width or its rectangle area. This assumes observations are spread uniformly within that interval for estimation. The original table does not reveal exact positions. At a class boundary, a continuous model treats an individual point as having no width; avoid applying these diagrams uncritically to exact point counts.

A reliable method

1. Read each class width from its boundaries and calculate f/width.

2. Draw adjoining bars with actual widths and density heights.

3. Recover frequencies using area and state uniform-within-class assumptions for partial intervals.

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LESSON 2 / WORKED EXAMPLES

See the method in action

Try each example in the space provided before reading its solution. Explain why the method fits the question, not just which calculation to enter.

Worked example 1

Classes [0, 10), [10, 30), [30, 40) have frequencies 10, 40, 30. Find density heights.

STEP-BY-STEP SOLUTION

Widths 10, 20, 10 give densities 1, 2, 3. Areas 10×1 = 10, 20×2 = 40, 10×3 = 30 recover the frequencies. The class [10, 30) has greatest frequency, but [30, 40) gives the tallest bar.

Worked example 2

For those data, estimate the number with $15 \leq x < 25$.

STEP-BY-STEP SOLUTION

This is a width-10 part of the width-20 class [10, 30), whose density is 2. Estimated count = 10×2 = 20, or half of 40. This assumes an even spread within that class.

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LESSON 2 / DISCUSS & PRACTISE

Explain it, then try it

DISCUSSION • TEST THE IDEA

Frequency density is not a probability density here: the total bar area is the number of observations, not 1. Dividing all frequencies by the total would produce a different normalised scale.

Say it in your own words

Explain the key idea to someone else. Use a small example to support your explanation. If you disagree with a claim, show why it fails.

2.1 A class [5, 15) has frequency 24. Find its density.

2.2 A bar spans [20, 35) and has density 1.6. Find its frequency.

2.3 Classes of widths 5 and 20 both have frequency 10. Compare density heights.

2.4 A class [0, 20) contains 50 observations. Estimate the count in [0, 8).

Check before turning to the answers: is the size sensible, is the notation clear, and have you included any required units?

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LESSON 3 / UNDERSTAND

Missing histogram scales and relative areas — Higher

Some histograms give vertical heights in grid units without a labelled density scale. The area rule still applies: frequency = k × (class width × drawn height), where k is a common scale factor for the whole diagram. Use one known class frequency to determine k. Do not assume a height is already frequency density unless the axis says so.

If a width-10 bar has drawn height 3 and frequency 60, its drawn area is 30 and k = 60/30 = 2 observations per area unit. A width-15 bar of drawn height 4 then represents 15×4×2 = 120 observations. Equivalently, use the ratio of areas: 60×60/30 = 120. The horizontal units and vertical grid units must stay consistent across bars.

For missing bars in a density-labelled histogram, calculate the missing frequency from the stated total, then divide by width. When reconstructing a total from a graph, add bar frequencies, not heights. If all frequencies are doubled with fixed class widths, all density heights double; if a class is merely split into two equal parts under a uniform model, its two heights stay the same while their areas share the frequency.

A reliable method

1. Determine whether the height scale is actual density or only a proportional drawing scale.

2. Use a known frequency and area to find the common multiplier when needed.

3. Calculate all unknown areas or heights and check them against any stated total.

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LESSON 3 / WORKED EXAMPLES

See the method in action

Try each example in the space provided before reading its solution. Explain why the method fits the question, not just which calculation to enter.

Worked example 1

A histogram has drawn heights: [0, 10) height 3, [10, 30) height 2. The first class frequency is 45. Find the second.

STEP-BY-STEP SOLUTION

First drawn area 10×3 = 30, so k = 45/30 = 1.5. Second area 20×2 = 40; frequency = 40×1.5 = 60. Comparing heights alone would give the wrong result.

Worked example 2

A density-labelled histogram has [0, 5) height 4 and [5, 15) unknown height. Total frequency is 50. Find the missing height.

STEP-BY-STEP SOLUTION

First frequency 5×4 = 20. Remaining frequency 50 − 20 = 30. Second width 10, so missing density 30/10 = 3.

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LESSON 3 / DISCUSS & PRACTISE

Explain it, then try it

DISCUSSION • TEST THE IDEA

An unlabeled vertical axis does not make a histogram unsolvable when a calibration frequency is supplied. Without calibration or a total, relative areas may determine proportions but not absolute counts.

Say it in your own words

Explain the key idea to someone else. Use a small example to support your explanation. If you disagree with a claim, show why it fails.

3.1 A width-8 bar of drawn height 5 represents 80 people. Find k.

3.2 Using that scale, find the count for a width-12 bar of drawn height 3.

3.3 Two bars have drawn areas 12 and 18. The total population represented by these two bars is 150. Find both frequencies.

3.4 A class [10, 30) of frequency 40 is split at 20 with an assumed even spread. Find the two densities.

Check before turning to the answers: is the size sensible, is the notation clear, and have you included any required units?

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LESSON 4 / UNDERSTAND

Cumulative frequency and estimating percentiles — Higher

Cumulative frequency counts observations up to successive upper class boundaries. For classes [0, 10), [10, 20), [20, 30) with frequencies 4, 8, 8, cumulative counts are 4, 12, 20. Plot a starting point at the lowest boundary with cumulative frequency zero, then points at upper boundaries: (0, 0), (10, 4), (20, 12), (30, 20). The graph must be non-decreasing. It rises by each class frequency, not by each midpoint.

For a graph representing N observations, use cumulative positions N/4, N/2 and 3N/4 to estimate Q1, median and Q3. Move horizontally from the cumulative-frequency level to the curve, then vertically down to the measurement axis. Reading the 90th percentile similarly uses 0.9N. Graph estimates depend on plotting and reading precision and do not recover the exact raw-data quartiles.

In this guide, the example graphs use straight segments between boundaries. Interpolating inside a segment assumes uniform distribution within that class. For a target cumulative count c in a class with lower boundary L, previous cumulative count C, frequency f and width w, estimate $x = L + (c - C)w/f$. A smooth hand-drawn curve can give slightly different reasonable readings. To estimate a count above a value, subtract the cumulative count below it from the total.

A reliable method

1. Accumulate frequencies and plot against upper boundaries, including the zero start.
2. Choose the required cumulative level and read the corresponding x-value.
3. Label estimates and explain within-class interpolation or graph-reading limitations.

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LESSON 4 / WORKED EXAMPLES

See the method in action

Try each example in the space provided before reading its solution. Explain why the method fits the question, not just which calculation to enter.

Worked example 1

Using frequencies 4, 8, 8 in [0, 10), [10, 20), [20, 30), estimate the median by linear interpolation.

STEP-BY-STEP SOLUTION

N = 20, so target cumulative count 10. It lies in [10, 20), with previous count 4, class frequency 8 and width 10. Median estimate = 10 + (10 − 4)×10/8 = 17.5.

Worked example 2

For the same model estimate Q1, Q3 and IQR.

STEP-BY-STEP SOLUTION

Q1 uses count 5: 10 + (5 − 4)×10/8 = 11.25. Q3 uses count 15: 20 + (15 − 12)×10/8 = 23.75. Estimated IQR = 23.75 − 11.25 = 12.5. These grouped-data estimates use a different information source from exact raw-list quartiles.

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LESSON 4 / DISCUSS & PRACTISE

Explain it, then try it

DISCUSSION • TEST THE IDEA

The final cumulative count is N, not 100 unless the axis is percentage cumulative frequency. A median at half the population is not necessarily at cumulative frequency 50.

Say it in your own words

Explain the key idea to someone else. Use a small example to support your explanation. If you disagree with a claim, show why it fails.

4.1 Find cumulative frequencies for class frequencies 5, 9, 6, 10.

4.2 For N = 80, state cumulative positions for Q1, median and Q3.

4.3 A straight cumulative segment runs from (10, 8) to (20, 24). Estimate x at cumulative count 16.

4.4 A cumulative graph for 120 observations estimates 85 below a threshold. Estimate the number at or above the threshold.

Check before turning to the answers: is the size sensible, is the notation clear, and have you included any required units?

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LESSON 5 / UNDERSTAND

Box plots and comparing distributions

A box plot displays a five-number summary on one numerical scale: minimum, Q1, median, Q3 and maximum. The box runs from Q1 to Q3 with a median line inside; whiskers reach the minimum and maximum for the basic convention used here. Some software uses whiskers only to non-outlier limits and marks outliers separately. Read the convention before interpreting a whisker as the overall extreme.

The box length is the IQR, not the range. Compare medians to discuss typical values and IQRs to discuss the spread of the central distribution. Whisker lengths can reveal asymmetry, but a box plot does not display every value, a mode or sample size unless supplied. Long whiskers do not automatically contain more observations; the horizontal length represents a wider span of measurement values. Ties and quartile conventions can complicate statements about exactly 25% in a section.

Use a common scale for comparison. If a slower journey time is undesirable, a lower median may be helpful; for a score or output quantity, the interpretation depends on the goal. A smaller IQR means greater central consistency, not necessarily a better outcome. A box plot alone cannot usually determine a mean or prove that one distribution dominates another at every point.

A reliable method

1. Mark five ordered summary values on a labelled common numerical scale.

2. Draw the Q1–Q3 box, median and whiskers using the stated convention.

3. Compare location and spread in context, and identify what the diagram cannot determine.

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LESSON 5 / WORKED EXAMPLES

See the method in action

Try each example in the space provided before reading its solution. Explain why the method fits the question, not just which calculation to enter.

Worked example 1

Draw a basic box plot from minimum 4, Q1 8, median 12, Q3 18, maximum 25. State range and IQR.

STEP-BY-STEP SOLUTION

On one scale mark 4, 8, 12, 18, 25. Box from 8 to 18, median at 12, whiskers to 4 and 25. Range $25 - 4 = 21$; IQR $18 - 8 = 10$.

Worked example 2

Journey A has summary 10, 18, 22, 26, 40 minutes; B has 12, 20, 25, 32, 38. Compare.

STEP-BY-STEP SOLUTION

A has the lower median, 22 versus 25 minutes, so a lower typical journey time. IQRs are 8 and 12 minutes, so A has less central variability. A’s range is larger, 30 versus 26, showing how conclusions about spread depend on the measure.

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LESSON 5 / DISCUSS & PRACTISE

Explain it, then try it

DISCUSSION • TEST THE IDEA

Boxes of equal visual width represent equal IQRs only when the numerical scales match. They do not imply equal sample sizes or identical distributions.

Say it in your own words

Explain the key idea to someone else. Use a small example to support your explanation. If you disagree with a claim, show why it fails.

5.1 A summary is 2, 5, 8, 11, 20. Find range and IQR.

5.2 Two groups have median 50, but IQRs 4 and 12. What can be concluded?

5.3 Can the mode normally be read from a box plot? Explain.

5.4 Why should a basic box plot’s left whisker not be labelled zero automatically?

Check before turning to the answers: is the size sensible, is the notation clear, and have you included any required units?

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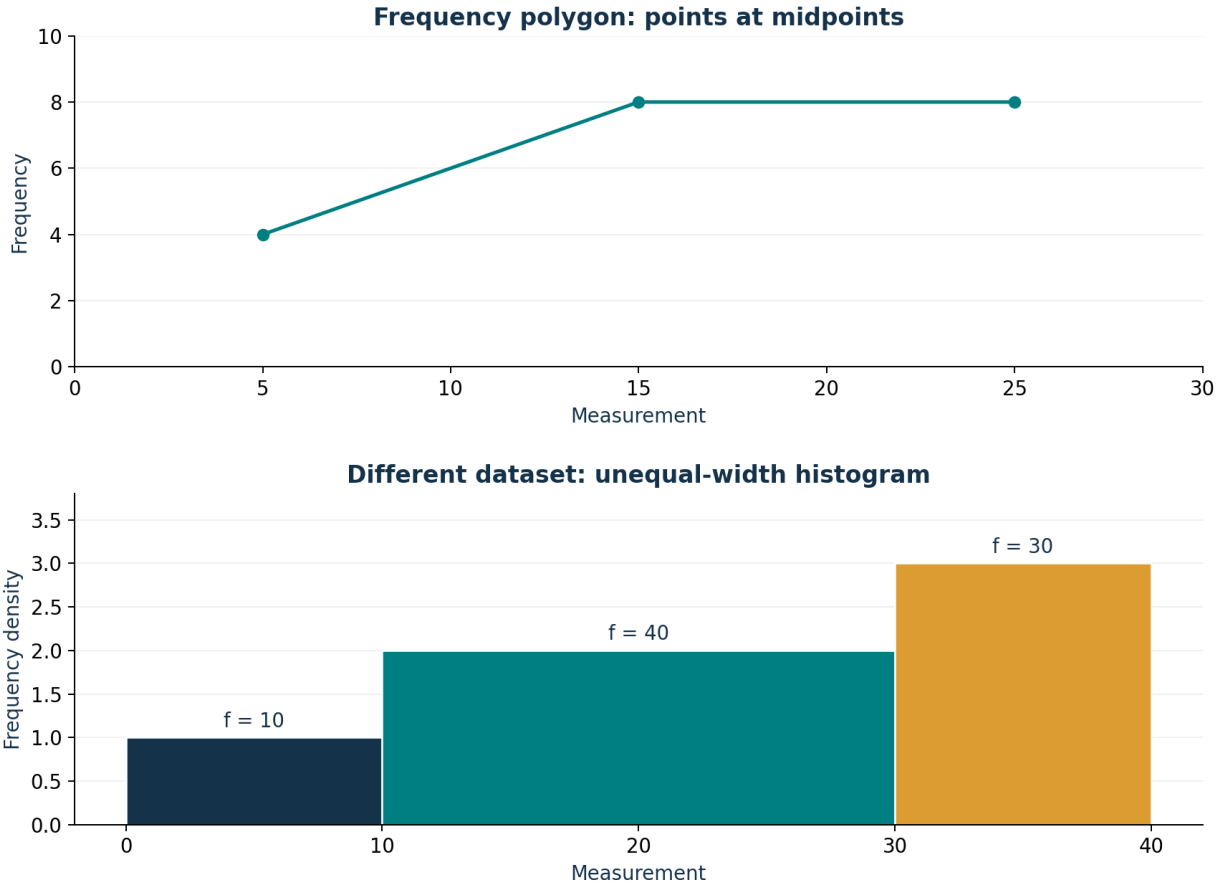
VISUAL EXPLAINER / READ DATA AND CHALLENGE THE MODEL

Read the model • 1



WHAT THE REPRESENTATION SHOWS

Top: frequencies 4, 8, 8 for width-10 classes are plotted at midpoints 5, 15, 25. Bottom: a separate distribution has classes [0, 10), [10, 30), [30, 40) and frequencies 10, 40, 30. Densities are 1, 2, 3; rectangle areas recover the counts. The tallest bar has frequency 30, while the widest bar contains 40. Polygon heights are frequencies; histogram heights here are densities.

Discuss: what does each axis or symbol represent? Identify the population, units and any assumptions. Recalculate one displayed result, then explain one conclusion the diagram cannot establish.

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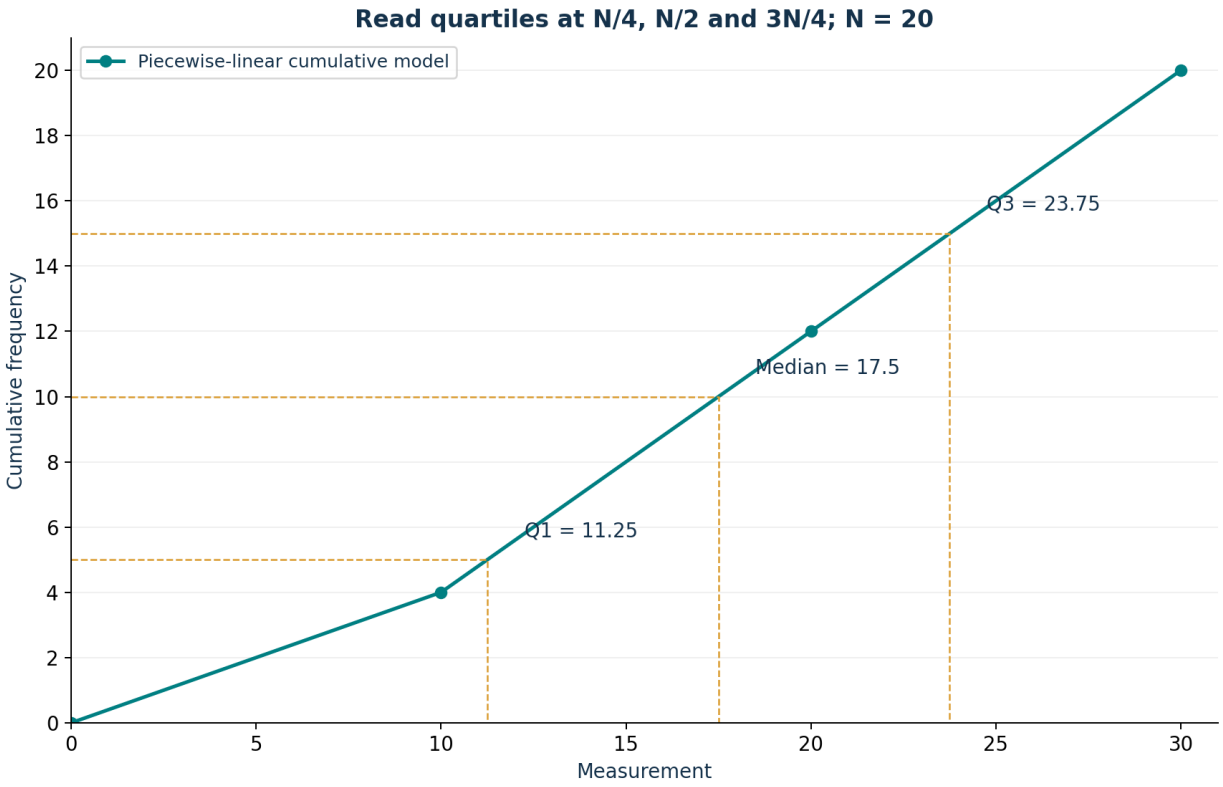
VISUAL EXPLAINER / READ DATA AND CHALLENGE THE MODEL

Read the model • 2



WHAT THE REPRESENTATION SHOWS

Class frequencies 4, 8, 8 accumulate to 4, 12, 20 at upper boundaries 10, 20, 30, starting at (0, 0). Quartile reading levels are 5, 10, 15. Straight-segment interpolation gives Q1 11.25, median 17.5, Q3 23.75 and IQR 12.5. These are estimates based on uniform distribution within each class; the raw values and their exact quartiles are unknown.

Discuss: what does each axis or symbol represent? Identify the population, units and any assumptions. Recalculate one displayed result, then explain one conclusion the diagram cannot establish.

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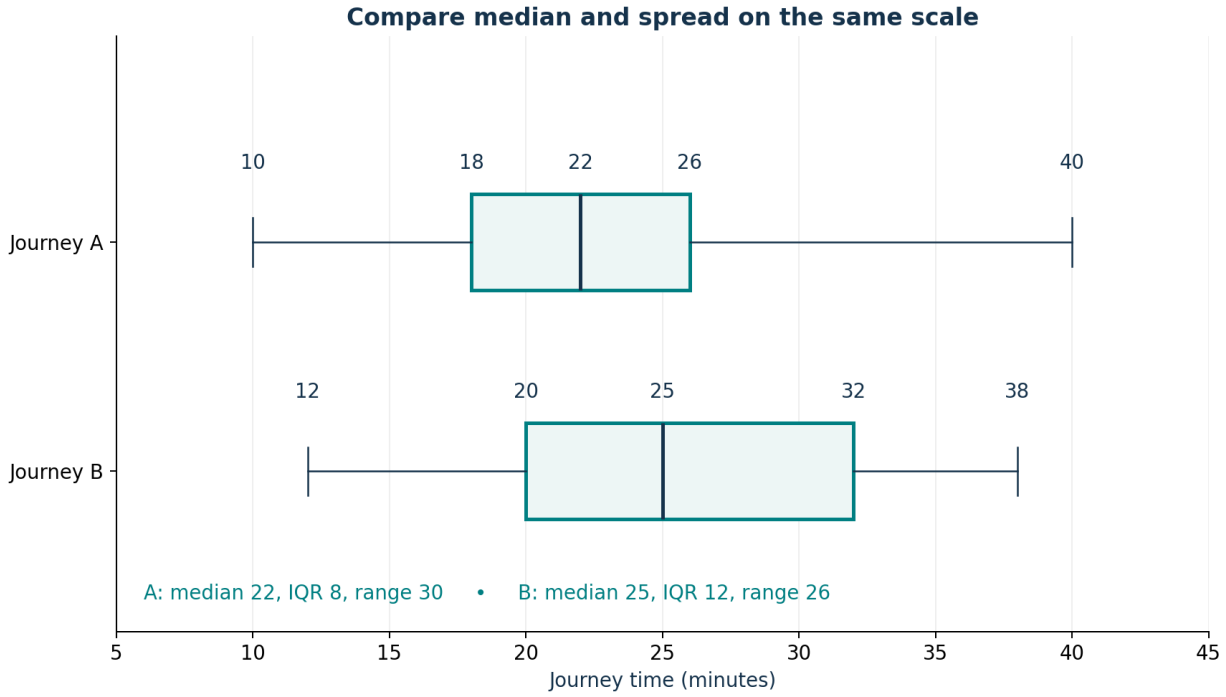
VISUAL EXPLAINER / READ DATA AND CHALLENGE THE MODEL

Read the model • 3



WHAT THE REPRESENTATION SHOWS

The whiskers use the minimum–maximum convention. A has a lower median journey time and a smaller IQR, so its typical journey is shorter and its central values are less spread out. However, A has a larger range. Different measures can therefore support different statements about variability. Neither plot shows the mean, mode or sample size.

Discuss: what does each axis or symbol represent? Identify the population, units and any assumptions. Recalculate one displayed result, then explain one conclusion the diagram cannot establish.

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MIXED REVIEW / ORIGINAL EXAM-STYLE PRACTICE

Apply your learning • 1

These questions are independently authored, not taken or adapted from past papers. Marks are suggested for self-assessment. Show your method and explain decisions. Use a calculator only where the arithmetic requires it.

R1. Classes [0, 6), [6, 12), [12, 18) have frequencies 3, 9, 6. State polygon points. [2 marks]

R2. Higher: classes [0, 5), [5, 15), [15, 20) have frequencies 10, 30, 20. Find histogram densities. [3 marks]

R3. Higher: use those data to estimate the count in [7, 12). [2 marks]

R4. Higher: an unscaled histogram bar of width 4 and height 3 represents 36 observations. Find the frequency of a width-10 bar of height 2. [3 marks]

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MIXED REVIEW / ORIGINAL EXAM-STYLE PRACTICE

Apply your learning • 2

These questions are independently authored, not taken or adapted from past papers. Marks are suggested for self-assessment. Show your method and explain decisions. Use a calculator only where the arithmetic requires it.

R5. Higher: class frequencies 6, 10, 14 correspond to boundaries 0, 10, 20, 30. State cumulative plot points. [3 marks]

R6. Higher: estimate the median for that cumulative model using straight segments. [3 marks]

R7. A basic box-plot summary is 3, 7, 10, 16, 24. State where the box and whiskers lie and find IQR. [3 marks]

R8. Two distributions have medians 14 and 18, with IQRs 6 and 4. They are waiting times in minutes. Compare. [2 marks]

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SOLUTIONS / LESSON PRACTICE

Check the reasoning

Your layout may differ. Compare the mathematical reasoning as well as the final answer. Correct any error, then reattempt the question without looking.

Lesson 1 • Frequency polygons and continuous class boundaries

1.1 Find midpoints for [0, 4), [4, 8), [8, 12).

2, 6, 10.

1.2 Those classes have frequencies 3, 7, 5. State polygon coordinates.

(2, 3), (6, 7), (10, 5).

1.3 Masses rounded to the nearest gram are grouped as 20–29 g. State underlying class boundaries.

$19.5 \leq m < 29.5$ g under the usual nearest-gram rounding model.

1.4 Why can comparing raw frequency polygons for samples of 20 and 200 be misleading?

Larger frequencies can simply reflect a larger sample. Use comparable totals or relative frequencies if comparing proportions and shape.

Lesson 2 • Histograms: frequency is represented by area — Higher

2.1 A class [5, 15) has frequency 24. Find its density.

Width 10; density $24/10 = 2.4$.

2.2 A bar spans [20, 35) and has density 1.6. Find its frequency.

Width 15; frequency $15 \times 1.6 = 24$.

2.3 Classes of widths 5 and 20 both have frequency 10. Compare density heights.

Heights 2 and 0.5. The narrow class is four times as tall; both bar areas are 10.

2.4 A class [0, 20) contains 50 observations. Estimate the count in [0, 8).

$8/20 \times 50 = 20$, assuming uniform distribution within the class. The exact count is not determined.

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SOLUTIONS / LESSON PRACTICE

Check the reasoning • continued

Lesson 3 • Missing histogram scales and relative areas — Higher

3.1 A width-8 bar of drawn height 5 represents 80 people. Find k.

Area 40; k = 80/40 = 2 people per drawn-area unit.

3.2 Using that scale, find the count for a width-12 bar of drawn height 3.

Area 36; frequency 36×2 = 72.

3.3 Two bars have drawn areas 12 and 18. The total population represented by these two bars is 150. Find both frequencies.

Area total 30; scale 150/30 = 5. Frequencies 60 and 90.

3.4 A class [10, 30) of frequency 40 is split at 20 with an assumed even spread. Find the two densities.

Each half has width 10 and estimated frequency 20, so both densities are 2, the same as the original bar.

Lesson 4 • Cumulative frequency and estimating percentiles — Higher

4.1 Find cumulative frequencies for class frequencies 5, 9, 6, 10.

5, 14, 20, 30.

4.2 For N = 80, state cumulative positions for Q1, median and Q3.

20, 40, 60.

4.3 A straight cumulative segment runs from (10, 8) to (20, 24). Estimate x at cumulative count 16.

16 is halfway from 8 to 24, so x = 15.

4.4 A cumulative graph for 120 observations estimates 85 below a threshold. Estimate the number at or above the threshold.

120 − 85 = 35 under the graph model. An exact count at the boundary cannot generally be recovered from grouped continuous data.

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SOLUTIONS / LESSON PRACTICE

Check the reasoning • continued

Lesson 5 • Box plots and comparing distributions

5.1 A summary is 2, 5, 8, 11, 20. Find range and IQR.

Range 18; IQR 6.

5.2 Two groups have median 50, but IQRs 4 and 12. What can be concluded?

They have the same displayed median; the group with IQR 4 has less central spread. Their means, ranges and sample sizes are not determined.

5.3 Can the mode normally be read from a box plot? Explain.

No. The five-number summary does not show individual frequencies, so it cannot usually identify the most frequent value.

5.4 Why should a basic box plot’s left whisker not be labelled zero automatically?

It ends at the given minimum under this convention. The data may start above or below zero.

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SOLUTIONS / MIXED REVIEW

Answers and marking guidance

Award the suggested method marks for valid working, even where a later arithmetic slip occurs. Do not count the same step twice. These are independent teaching allocations, not official exam-board mark schemes.

R1. Classes [0, 6), [6, 12), [12, 18) have frequencies 3, 9, 6. State polygon points. [2 marks]

Midpoints 3, 9, 15 give (3, 3), (9, 9), (15, 6). [1 midpoints; 1 matching frequencies.]

R2. Higher: classes [0, 5), [5, 15), [15, 20) have frequencies 10, 30, 20. Find histogram densities. [3 marks]

Widths 5, 10, 5 give heights 2, 3, 4. [1 each correct density.]

R3. Higher: use those data to estimate the count in [7, 12). [2 marks]

This width-5 interval lies inside the density-3 class, giving estimate 15. Assume uniform distribution within [5, 15). [1 calculation; 1 assumption.]

R4. Higher: an unscaled histogram bar of width 4 and height 3 represents 36 observations. Find the frequency of a width-10 bar of height 2. [3 marks]

Known area 12 gives k = 3. Other area 20 gives frequency 60. [1 area; 1 scale; 1 result.]

R5. Higher: class frequencies 6, 10, 14 correspond to boundaries 0, 10, 20, 30. State cumulative plot points. [3 marks]

(0, 0), (10, 6), (20, 16), (30, 30). [1 zero start; 1 cumulative totals; 1 boundaries.]

R6. Higher: estimate the median for that cumulative model using straight segments. [3 marks]

N = 30; target 15. It lies in [10, 20): 10 + (15 − 6)×10/10 = 19. [1 target; 1 interpolation; 1 estimate.]

R7. A basic box-plot summary is 3, 7, 10, 16, 24. State where the box and whiskers lie and find IQR. [3 marks]

Box 7–16, median 10, whiskers to 3 and 24; IQR 9. [1 box; 1 median/whiskers; 1 IQR.]

R8. Two distributions have medians 14 and 18, with IQRs 6 and 4. They are waiting times in minutes. Compare. [2 marks]

First has a shorter typical wait; second has less central variability. Neither statement says every first wait is shorter. [1 contextual median; 1 contextual spread.]

Reflect, repair and revisit

Record one secure method, one mistake you corrected and one question to retry. Reattempt the questions you missed in a few days. Explain why your new method works before you compare your answer.

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