Data Insights: the interactive question types

Data Insights

1 Four question types, one habit

- Each type gives you more data than you need
- Ask first: what does the question need?
- Pull out only that, then test it carefully
- Speed comes from ignoring the right things

IN THE LESSON

- Think of a detective arriving at a messy room.
- A good detective does not photograph everything.
- They ask what question they are trying to answer, and then looks only at the clues that matter.
- Data Insights rewards exactly that habit.
- Every one of these four question types gives you more information than you need.
- A table has many columns, a chart has many bars, and a set of tabs has pages of text.
- Your job is to decide what the question needs, pull out just that, and test it carefully.
- Speed on the exam comes from ignoring the right things.
- Accuracy comes from checking the few things you keep.

2 One method for every interactive question

The same four moves each time

Read the question first → Name what you need → Pull out and work it → Check the traps

IN THE LESSON

- Here is the method as a picture, and you will use it all lesson.
- Follow the boxes from left to right.
- First, read the question or the statements before you study the data.
- Then name exactly what you need: which column, which axis, which condition, or which tab.
- Third, pull out those figures and work them, estimating first and using the on-screen calculator only when the choices are close.
- Last, check the traps.
- Did you answer the question that was asked?
- Did you respect the units?
- Did a word like every, exactly, or at least change the meaning?
- Four steps, in this order, every time.
- It sounds simple, and that is the point.

3 Table analysis: how it is set

- A sortable table and three statements
- All three answers must be right to score
- Read the statements first, then the table
- Name the column and the condition, then sort

IN THE LESSON

- Let's begin with table analysis.
- You are shown a table that works like a small spreadsheet, and you may sort it by any column.
- Beneath it are three statements.
- Each needs one of two answers, such as yes or no, true or false, or consistent or inconsistent.
- The question counts only if all three answers are right, so there is no room to guess lazily.
- Here is the key trick: read the statements first.
- Most of the table will not matter to any of them.
- For each statement, name the column it turns on and the condition it sets, then sort by that column so the rows that qualify sit together.
- Use the table alone, not what you know about the real world.

4 Example 1: five depots, sorted by parcels

An example: depots sorted by parcels per day (staff in the middle)

Dunmore	40 staff	**1,400**
Corby	25 staff	**1,250**
Brent	30 staff	**1,080**
Ashby	20 staff	**900**
Elston	12 staff	**540**

IN THE LESSON

- Here is our first example table.
- A courier firm has five depots, and the column we care about is parcels handled per day.
- It also lists staff, which we will use shortly.
- Notice we have sorted the table from most parcels to fewest.
- Dunmore handles fourteen hundred, Corby twelve hundred and fifty, Brent one thousand and eighty, Ashby nine hundred, and Elston five hundred and forty.
- Sorting costs a click, and it pays back at once.
- Rank questions, counts above a cut-off and medians are now simply read off the list.
- The three statements will be: exactly two depots handle more than twelve hundred parcels a day; the median is above eleven hundred; and every depot handles at least forty parcels per staff member.

5 Example 1: statements one and two

Five depots, parcels per day, sorted

S1: exactly two above 1,200	Dunmore and Corby only	**True**
S2: median above 1,100	3rd of 5 sorted is Brent	**False**
Median	middle of five sorted	**1,080**
Mean, for contrast	5,170 ÷ 5	**1,034**

Use the measure the statement names

IN THE LESSON

- Statement one says exactly two depots handle more than twelve hundred parcels a day.
- Look down the sorted column.
- Dunmore at fourteen hundred is above.
- Corby at twelve fifty is above.
- Brent at one thousand and eighty is not, and nothing below it can be.
- So exactly two.
- True.
- Statement two says the median is above eleven hundred.
- There are five depots, an odd number, so the median is the third value in the sorted list, which is Brent at one thousand and eighty.
- That is below eleven hundred, so the statement is false.
- Notice the trap.
- The mean is five thousand one hundred and seventy divided by five, which is one thousand and thirty four, also below eleven hundred, but we did not need it.
- Use the measure the statement names.

6 Example 1: statement three, a ratio

S3: every depot handles at least 40 parcels per staff member

Dunmore	1,400 ÷ 40	**35**
Brent	1,080 ÷ 30	**36**
Corby	1,250 ÷ 25	**50**
Ashby	900 ÷ 20	**45**
Elston	540 ÷ 12	**45**

One row below 40 makes every false

IN THE LESSON

- Statement three is different: every depot handles at least forty parcels per staff member.
- This needs a ratio, parcels divided by staff, and the word every is a warning.
- One depot that fails makes the whole statement false, so go hunting for the failure rather than checking everyone.
- Estimate first.
- Dunmore has forty staff, and forty staff at forty parcels each would be sixteen hundred.
- Dunmore handles only fourteen hundred, so it falls short.
- Exact work confirms it: fourteen hundred divided by forty is thirty five.
- Brent is also short, at one thousand and eighty over thirty, which is thirty six.
- The others pass.
- One failing row is enough, so statement three is false.
- The final answers are true, false, false.

7 Two table tools: middle place and ratio

Middle place = (n + 1) ÷ 2
Per-unit ratio = total ÷ units

Number of rows (n)	How many rows
Middle place	Where the median sits
Per-unit ratio	Total divided by units

IN THE LESSON

- Two small tools do most of the work in table analysis.
- First, the median position.
- Sort the column and count the rows, which we call n.
- If n is odd, the middle place is n plus one, divided by two.
- Five rows gives place three.
- If n is even there are two middle rows, so the median is the average of the two.
- Second, the per-unit ratio.
- When a statement says per staff member, per seat or per hour, divide the total by the number of units.
- The letter n is how many rows there are.
- The middle place tells you where to look in the sorted list.
- And the ratio is simply the total divided by the units.
- Estimate it before you press any buttons.

8 Example 2: an even count and a cut-off

An example: six stations, daily hires, sorted

Sorted hires	410 380 350 350 320 290	
Median of six	(350 + 350) ÷ 2	**350**
More than 350	410 and 380	**2 stations**
At least 350	410, 380, 350, 350	**4 stations**

Rows equal to the cut-off split the two phrases

IN THE LESSON

- Example two.
- A bike scheme has six stations.
- Sorted, their daily hires are four hundred and ten, three hundred and eighty, three hundred and fifty, three hundred and fifty, three hundred and twenty and two hundred and ninety.
- With six rows the median sits between the third and fourth.
- Both are three hundred and fifty, so the median is three hundred and fifty.
- Now two statements that sound alike.
- More than three hundred and fifty hires: only the top two stations, so two.
- At least three hundred and fifty hires: those two plus the two stations sitting exactly on the line, so four.
- Whenever a row equals the cut-off, more than and at least give different counts.
- That is a favourite place for the exam to hide a trap.

9 Table analysis: the traps

- Sort by the column the statement names
- Every: one failing row makes it false
- Exactly, more than, at least: check the line
- Even count: average the middle two
- Table only; close ratios: use the calculator

IN THE LESSON

- Let's collect the traps.
- One: sorting by the wrong column.
- Before you click, say aloud what the statement turns on.
- Two: the word every.
- It is false if even one row breaks it, so look for a counter-example.
- Its partner, at least one, is true if even one row passes.
- Three: exactly, more than and at least.
- Count carefully where a row sits right on the line.
- Four: a median of an even number of rows, which is the average of the middle two, not either one.
- Five: outside knowledge.
- If the table says a cafe has forty seats, it has forty seats, even if that seems odd.
- And last, on the same line, unrounded ratios.
- When choices are close, use the calculator.
- When they are far apart, estimate and move on.

10 Graphics interpretation: how it is set

- One chart, then sentences with drop-down blanks
- Read the title, both axes, units and legend
- Decide what each blank asks for
- Well-spaced choices need only an estimate

IN THE LESSON

- Now graphics interpretation.
- Here you see one chart, which could be a bar or line graph, a scatter plot, a pie chart or a histogram.
- Beneath it sits a sentence or two with blanks, and each blank is a drop-down menu of choices.
- Before you do anything else, read the title, both axes with their units, and any legend.
- A scale marked in thousands, or in percentages, changes the meaning of every number.
- Then ask what each blank wants.
- Is it a value, a difference, a percentage change, a ratio, a count of points, or the direction of a relationship?
- Read values against the gridlines.
- When the choices are well spaced, a careful estimate is enough.

11 Example 3: monthly app downloads

Downloads (thousands)

June	**40**
July	**50**
August	**45**
September	**60**
October	**90**

An example, not real data

IN THE LESSON

- Here is an example chart, with made up numbers.
- A small app tracks downloads each month, in thousands.
- Start with the axis: the side label says downloads in thousands, so a bar marked ninety means ninety thousand.
- Now the bars, from left to right.
- June is forty.
- July is fifty.
- August is forty five.
- September is sixty.
- And October is ninety.
- Two blanks will use this chart.
- Blank one: October downloads were about what percentage higher than June?
- Blank two: August downloads were about what percentage lower than July?
- Both blanks ask for a percentage change, and that has a rule you must know cold.
- The next slide gives it.

12 Percent change

Percent change = (new − old) ÷ old × 100

New value	The later figure
Old value	The starting figure
Percent change	Positive up, negative down

IN THE LESSON

- A percentage change compares a new value to an old one, and the rule is to measure from the starting value.
- Subtract the old from the new, divide by the old, then multiply by one hundred.
- Let's name the terms.
- The old value is the earlier figure, the one you start from.
- The new value is the later figure.
- And the percent change is the answer: positive for a rise, negative for a fall.
- The most common slip on the exam is dividing by the wrong number, usually the later one.
- If the question says higher than June, June is the base.
- If it says lower than July, July is the base.
- The word after than names your starting point.

13 Example 3: the two blanks

Percent change, measured from the starting month

Oct against Jun	90 − 40	**+50**
Divide by Jun	50 ÷ 40 × 100	**125%**
Trap: divide by Oct	50 ÷ 90 × 100	**about 56%**
Aug against Jul	(45 − 50) ÷ 50 × 100	**−10%**
Trap: divide by Aug	5 ÷ 45 × 100	**about 11%**

IN THE LESSON

- Blank one: October against June.
- The difference is ninety minus forty, which is fifty.
- Divide by the starting value, June, so fifty divided by forty is one point two five, or one hundred and twenty five per cent higher.
- Watch the trap option.
- Fifty divided by ninety, dividing by October, gives about fifty six per cent, and it will be in the menu.
- Blank two: August against July.
- The difference is forty five minus fifty, which is minus five.
- Divide by the starting value, July, fifty.
- Minus five over fifty is minus ten per cent, so August is ten per cent lower.
- The trap here is dividing by August, which gives about eleven per cent.
- Close numbers, different answers.
- Always ask which one came first.

14 Example 4: a scatter plot

Chart: Sales ($ thousands) vs Advertising spend ($ thousands)

- •
- •
- •
- •
- •
- •
- •
- Sales = 20
- Rising: positive relationship

IN THE LESSON

- Now a scatter plot, again with made up numbers.
- Each dot is one shop.
- Along the bottom is money spent on advertising, in thousands of dollars.
- Up the side is sales, also in thousands.
- The dots climb from the lower left to the upper right.
- Shops that spend more tend to sell more, so the relationship is positive.
- If the dots fell from top left to bottom right, it would be negative, and a shapeless cloud means a relationship near zero.
- Now a typical blank: how many shops sold more than twenty thousand?
- Read the dotted line at twenty.
- Three dots sit above it.
- One dot sits exactly on the line, and it is not more than twenty.
- So the answer is three.
- Careful reading beats guessing.

15 Example 5: a histogram and its middle

An example: twenty call lengths, in classes of ten minutes

0 to 10 minutes	3 calls	**3 so far**
10 to 20 minutes	6 calls	**9 so far**
20 to 30 minutes	7 calls	**16 so far**
30 to 40 minutes	3 calls	**19 so far**
40 to 50 minutes	1 call	**20 so far**

10th and 11th calls both fall in 20 to 30

IN THE LESSON

- A histogram groups values into classes, and the height of each bar is how many values fall in the class.
- Here is an example of twenty call lengths in minutes.
- Zero to ten has three calls, ten to twenty has six, twenty to thirty has seven, thirty to forty has three, and forty to fifty has one.
- To find the middle, add up as you go: three, nine, sixteen, nineteen, twenty.
- With twenty values, the median is halfway between the tenth and eleventh.
- The tenth is in the twenty to thirty class, because the running total reaches nine at the end of the second class and sixteen at the end of the third.
- So is the eleventh.
- The median class is twenty to thirty.
- Grouped data gives ranges, never exact values.

16 Pie charts and wording traps

- A pie shows shares of one total only
- 40% of $2,000 = $800; 25% of $4,000 = $1,000
- Points is not the same as percent
- Approximate: estimate, then pick the nearest

IN THE LESSON

- Pie charts have their own trap.
- A pie shows shares of one total, so two pies cannot be compared by size unless you know the two totals.
- Suppose rent is forty per cent of city A's budget, and twenty five per cent of city B's.
- It looks as though A spends more on rent.
- But if A's budget is two thousand dollars and B's is four thousand, A pays eight hundred and B pays one thousand.
- A smaller share of a bigger pie can be a bigger amount.
- Two more wording traps.
- Higher by a certain number of points is not the same as higher by a certain percentage.
- And a question asking for an approximate answer wants a quick estimate, not a long calculation.

17 Four mistakes that cost marks

- Answering a different question from the one asked
- Ignoring units, scale or the time period
- Dividing by the wrong base in a percentage change
- Trusting a first look: check by a second route

IN THE LESSON

- Before we move on, four mistakes that cost marks across all these question types.
- One.
- Answering a different question from the one asked.
- Reread the blank or the statement before you commit.
- Two.
- Ignoring the units, such as thousands or percentages, or the time period.
- Three.
- Dividing by the wrong base in a percentage change, or averaging a median when the count is odd.
- Four.
- Trusting a first look.
- A bar can look taller because the axis starts above zero, and two close choices can hide a calculation that matters.
- When you check, change your method.
- If you first estimated, now calculate.
- If you read upward, now read the gridlines across.
- A second route catches what the first one hides.

18 Two-part analysis: how it is set

- One scenario, one shared list, two columns
- Both choices must be right to score
- Read the column headings first
- The same option may serve both columns

IN THE LESSON

- Next, two-part analysis.
- You get one scenario, then one list of options, usually five or six, shared by two columns.
- You choose one option in each column, and the question counts as right only when both choices are right.
- The scenario ties the columns together.
- They might be two unknowns linked by the same conditions, the two sides of a trade-off, or two roles in an argument, such as one statement that strengthens a claim and another that weakens it.
- Read the column headings first, because they tell you what each choice must do.
- And remember, the same option can be correct in both columns.
- Never rule an option out only because you have already used it once.

19 Method for two-part questions

Quantitative two-part

Name each column → Write each condition → Solve or test pairs → Check every condition

IN THE LESSON

- Here is the method for the quantitative version.
- Follow the boxes.
- First, read the column headings and say what each column must be.
- Second, turn each condition in the scenario into an equation, or into a test you can apply to a pair.
- Third, solve, or if solving is slow, test the options in pairs.
- Remember that the options are the only values allowed, so a quick plug-in often beats the algebra.
- Fourth, check both of your choices against every condition.
- This last step matters most, because the wrong pairs are built to pass some of the conditions.
- A pair that satisfies only one of two conditions is the usual trap.
- Check before you click.

20 Example 6: tickets, solving it

Adult $12, child $7, total $225, 5 more children than adults

Write the conditions	12A + 7C = 225 and C = A + 5	
Substitute	12A + 7(A + 5) = 225	
Collect terms	19A + 35 = 225	**19A = 190**
Solve for adults	A = 190 ÷ 19	**A = 10**
Use the link	C = 10 + 5	**C = 15**

IN THE LESSON

- Example six.
- A school buys tickets for a trip.
- An adult ticket costs twelve dollars and a child ticket costs seven.
- The total bill is two hundred and twenty five dollars, and the school buys five more child tickets than adult tickets.
- The options are three, five, ten, twelve, fifteen and twenty seven.
- Column one is the number of adult tickets.
- Column two is the number of child tickets.
- Call adults A and children C.
- Condition one: twelve A plus seven C equals two hundred and twenty five.
- Condition two: C equals A plus five.
- Substitute the second into the first: twelve A plus seven times A plus five equals two hundred and twenty five.
- That gives nineteen A plus thirty five equals two hundred and twenty five, so nineteen A is one hundred and ninety, and A is ten.
- Then C is fifteen.

21 Example 6: the pair-testing check

Test each condition against pairs from the list

Money test passes	12A + 7C = 225	**10, 15 and 3, 27**
Link test passes	C = A + 5	**5, 10 and 10, 15**
Passes both	appears in both lists	**10 and 15**
Final check	120 + 105	**225**

A pair that passes one test is the usual trap

IN THE LESSON

- Now see the same problem the other way, by testing pairs from the list.
- Which pairs satisfy the money condition?
- Ten adults and fifteen children gives one hundred and twenty plus one hundred and five, which is two hundred and twenty five.
- Good.
- But so does three adults and twenty seven children: thirty six plus one hundred and eighty nine, also two hundred and twenty five.
- Which pairs satisfy the link, five more children than adults?
- Five and ten does, and so does ten and fifteen.
- The only pair on both lists is ten and fifteen.
- Look at the traps.
- Three and twenty seven handles the money but not the link.
- Five and ten handles the link but not the money.
- Each wrong pair passes exactly one condition.

22 Example 7: a trade-off between two plans

Plans: allowance and monthly fee. Cost per GB at right

Plan A	10 GB, $15	**$1.50**
Plan B	20 GB, $22	**$1.10**
Plan C	30 GB, $26	**$0.87**
Plan D	50 GB, $40	**$0.80**
Plan E	20 GB, $24	**$1.20**

Lowest per GB: D. Cheapest with 25 GB or more: C

IN THE LESSON

- Example seven is a trade-off.
- A shop compares five phone plans, each with a data allowance and a monthly fee.
- Column one: the plan with the lowest cost per gigabyte.
- Column two: the cheapest plan that offers at least twenty five gigabytes.
- Work out cost per gigabyte for each plan by dividing the fee by the allowance.
- Plan A is fifteen over ten, which is one dollar fifty.
- Plan B is twenty two over twenty, one dollar ten.
- Plan C is twenty six over thirty, about eighty seven cents.
- Plan D is forty over fifty, eighty cents.
- Plan E is twenty four over twenty, one dollar twenty.
- The lowest is plan D.
- Now filter to at least twenty five gigabytes: only C and D qualify, and C costs less.
- So the answers are D and C.

23 Example 8: a verbal two-part question

Claim: a loyalty card will raise a bakery's weekly sales

Option	Effect on the claim
Rival shops saw sales rise after cards	Strengthens
Cards reward visits already planned	Weakens
Each card costs $2 to print	Irrelevant
Most rivals' cards go unused	Weakens

IN THE LESSON

- Not every two-part question has numbers.
- Here is a verbal one.
- A bakery claims that a loyalty card will raise its weekly sales.
- Column one asks for the statement that most strengthens the claim.
- Column two asks for the one that most weakens it.
- Go through the options against one column at a time.
- Rival shops saw sales rise after they introduced cards: that strengthens.
- Cards only reward visits that customers had already planned: that weakens, because the card adds no new sales.
- Each card costs two dollars to print: that is about cost, not sales, so it is irrelevant to this claim.
- Most rivals' cards go unused: that weakens.
- Pick the strongest in each column, then check the pair together.

24 Two-part analysis: the traps

- Do both columns, not just the first
- Test the pair against every condition
- The same option can be used in both columns
- Judge each option for the column you are in
- Put the answers back into the story

IN THE LESSON

- Collect the traps for two-part questions.
- One.
- Solving for the first column and forgetting the second.
- Both must be right, so finish the job.
- Two.
- The half-right pair.
- Wrong options are built to satisfy one condition, so always test your pair against every condition in the scenario.
- Three.
- Assuming each option may be used only once.
- If the same number fits both columns, it can be chosen twice.
- Four.
- In verbal questions, judging an option in general instead of for the column you are in.
- Strengthen and weaken are opposite jobs.
- And five.
- Skipping the sanity check at the end.
- Put your two numbers back into the story.
- If the story no longer makes sense, something went wrong.

25 Multi-source reasoning: how it is set

- Two or three tabs: email, table, memo
- Skim each tab for its topic and its terms
- Read the question, then pick the tabs it needs
- Apply a rule from one tab to data in another

IN THE LESSON

- Finally, multi-source reasoning.
- You get two or three tabs of material, such as an email, a table and a memo, and several questions about them.
- Some questions have five answer choices.
- Others list three statements, each to be marked one of two ways, such as yes or no, and these count only if all three are right.
- Skim each tab first, just to learn what it covers and how it defines its terms.
- Do not try to memorise the numbers.
- Then read the question and decide which tabs it needs.
- Many questions apply a rule from one tab to figures from another.
- And watch for sources that disagree, because the data settles a question about the data, whatever the writer believes.

26 Reading a set of tabs

Multi-source routine

Skim each tab → Choose the tabs needed → Apply the rule to data → Check conflicts and wording

IN THE LESSON

- Here is the routine.
- Follow the boxes.
- Skim means just that: spend a few seconds on each tab to see what it is and how it uses its terms, such as what counts as an occupied room.
- Next, read the question and decide which tabs it needs.
- Often only one or two matter.
- Third, apply the rule to the data.
- Find the condition in the memo, find the figures in the table, and work them out.
- Fourth, check for conflicts and for wording.
- If a claim in the email conflicts with the table, the table wins on questions about the data.
- And is the question asking what is stated, or what can be inferred?
- Those are different demands.

27 Example 9: a hotel group, the sources

Table: rooms, rooms occupied on an average night, guest score

Quay	80 rooms, 52 occupied	**score 8.4**
Park	120 rooms, 66 occupied	**score 7.6**
Dene	50 rooms, 35 occupied	**score 7.2**
Memo rule	refit when both are below	**60% and 8.0**
Email	Quay is the busiest hotel	**claim**

IN THE LESSON

- Example nine, with made up details.
- A hotel group's set has three tabs.
- The memo says a hotel gets a refit when its occupancy is below sixty per cent and its guest score is below eight.
- Occupancy means rooms occupied on an average night, as a share of all rooms.
- The table lists three hotels.
- Quay has eighty rooms, fifty two occupied, and a guest score of eight point four.
- Park has one hundred and twenty rooms, sixty six occupied, score seven point six.
- Dene has fifty rooms, thirty five occupied, score seven point two.
- The email, from the Quay manager, says Quay is the group's busiest hotel.
- The three statements are: Park will be refit, Dene will be refit, and the table supports the email.

28 Example 9: apply the rule to the table

Occupancy = rooms occupied ÷ rooms

Quay	52 ÷ 80	**65%**
Park	66 ÷ 120	**55%**
Dene	35 ÷ 50	**70%**
Refit test	both below 60% and 8.0	**Park only**

IN THE LESSON

- The memo's rule is about occupancy, but the table gives rooms, so the first job is a division for each hotel.
- Quay: fifty two divided by eighty is sixty five per cent.
- Park: sixty six divided by one hundred and twenty is fifty five per cent.
- Dene: thirty five divided by fifty is seventy per cent.
- Now apply the two-part rule, which needs both conditions at once.
- Quay has occupancy of sixty five, not below sixty, so no refit.
- Park has fifty five, below sixty, and a score of seven point six, below eight, so Park is refit.
- Dene scores low, seven point two, but occupancy is seventy, which is not below sixty, so Dene is not refit.
- Only Park passes both tests.

29 Example 9: the three statements

Mark each statement Yes or No

S1: Park will be refit	55% and 7.6, both below	**Yes**
S2: Dene will be refit	70% is not below 60%	**No**
S3: table backs the email	Park has more rooms occupied	**No**
Busiest by share	Dene 70% beats Quay 65%	**Dene**

The data settles it, whatever the email says

IN THE LESSON

- Now the three statements.
- Statement one, Park will be refit: yes, as we just saw.
- Statement two, Dene will be refit: no, because its occupancy of seventy per cent is not below sixty.
- Statement three, the table supports the email's claim that Quay is the busiest hotel.
- Test it both ways.
- By rooms occupied, Park has sixty six, more than Quay's fifty two.
- By occupancy rate, Dene is at seventy, above Quay's sixty five.
- Whichever way you read busiest, the table contradicts the email.
- So the answer is no.
- This is the data-beats-opinion rule in action.
- The manager may sincerely believe it, but the question asks what the table supports, and the table says otherwise.
- The answers are yes, no, no.

30 Example 10: one fact changes

What if Dene's average were 28 rooms occupied?

Dene occupancy	28 ÷ 50	**56%**
Dene guest score	unchanged	**7.2**
Both under the limits	56 under 60, 7.2 under 8.0	**Refit**
Quay and Park	nothing else changed	**as before**

IN THE LESSON

- Questions sometimes change a single fact and ask what follows.
- Suppose Dene had averaged twenty eight occupied rooms instead of thirty five.
- Everything else stays exactly as given: the memo's rule, the guest scores and every other hotel.
- Recompute only what the change touches.
- Dene's occupancy becomes twenty eight divided by fifty, which is fifty six per cent.
- That is now below sixty.
- Its guest score is still seven point two, below eight.
- Both conditions hold, so Dene would be refit.
- Quay and Park do not change at all.
- The discipline is to keep every other fact as given.
- Do not let the new number tempt you to adjust something else.
- Change one thing, recompute one thing, and answer.

31 Inference, relevance and sources that clash

- Infer only what the sources force
- Likely, or sensible-sounding, is not enough
- If is not the same as only if
- Data settles data questions; ask which tabs matter

IN THE LESSON

- One last skill: keeping inferences tight.
- A statement can be inferred only if the sources force it.
- Sounding likely is not enough.
- If the memo says a hotel gets a refit only if its occupancy is low, a low occupancy alone does not guarantee a refit.
- That wording gives a necessary condition, not a sufficient one.
- Learn to separate if from only if.
- Then relevance.
- Some tabs, and some columns, are there as decoys, so ask which tabs this question needs.
- Finally, clashes.
- When an email and a table disagree, a question about the data is settled by the data.
- When a question is about what the writer said, the email is the source.
- Read which one the question wants.

32 Recap: four types, four first moves

Recap: the first move for each question type

Question type	First move
Table analysis	Sort the named column
Graphics interpretation	Read axes and units
Two-part analysis	Test the pair on all conditions
Multi-source reasoning	Apply the rule to the data

IN THE LESSON

- Let's pull the lesson together.
- Table analysis: read the statements first, sort the column they name, and hunt for the one row that breaks every.
- Graphics interpretation: read title, axes and units, decide what each blank wants, and measure percentage change from the starting value.
- Two-part analysis: read the column headings, write each condition, and test your pair against all of them, remembering the same option can serve both columns.
- Multi-source reasoning: skim the tabs, pick the ones you need, apply the rule from one to the figures in another, and let the data beat opinion.
- All four share the same four moves: read the question first, name what you need, work it, then check the traps.

33 Try three quick questions

1. Memo: reorder if stock is under 25% of capacity. Store holds 30 of 150. Reorder?
   Answer: 30 ÷ 150 = 20%, under 25%: yes, reorder.
2. Orders went 80 to 100, then fell to 75. Percent change, 100 to 75?
   Answer: (75 − 100) ÷ 100 × 100 = −25%.
3. Two numbers sum to 14 and differ by 4. Which pair?
   Answer: 9 and 5: 9 + 5 = 14 and 9 − 5 = 4.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A memo says reorder when stock is under twenty five per cent of capacity.
- A table shows a store holding thirty units with a capacity of one hundred and fifty.
- Should it reorder?
- Thirty over one hundred and fifty is twenty per cent, which is under twenty five, so yes.
- Question two.
- Orders rose from eighty to one hundred, then fell to seventy five.
- What was the percentage change from one hundred to seventy five?
- Minus twenty five divided by one hundred is minus twenty five per cent.
- Question three.
- Two numbers add to fourteen and differ by four.
- Pick the larger and the smaller.
- The larger is nine and the smaller is five, because nine plus five is fourteen and nine minus five is four.