

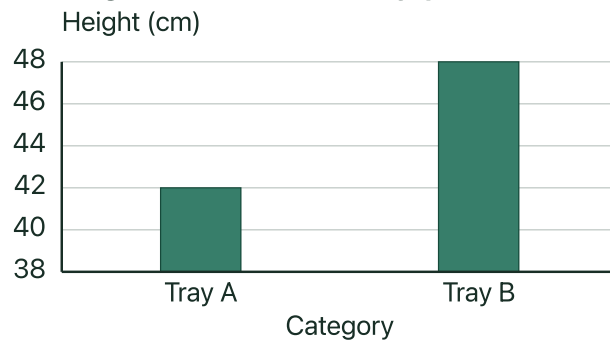
Misleading graphs: check the scale and the claim

Compare your reasoning, not just the final result. Equivalent correct methods are welcome.

Public practice with published answers. This is not a full-topic readiness assessment.

1. Where does this vertical axis begin, and how many centimetres does one labelled interval represent?

Seedlings measured on Friday (invented data)



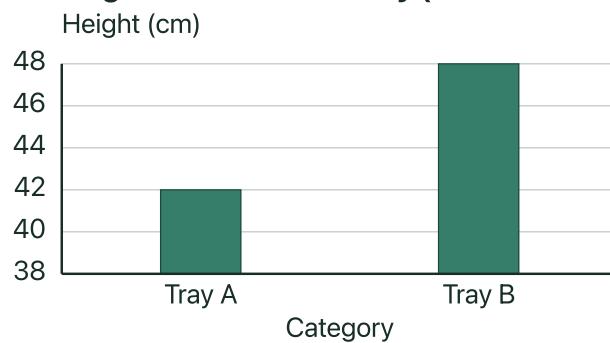
Vertical axis begins at 38, not zero.

Worked solution 1: It begins at 38 cm; each interval is 2 cm.

1. Read the bottom label, 38, rather than assuming zero.
2. Adjacent labels increase by 2, for example 38 to 40.

2. Find the actual difference between the two recorded heights. Show your calculation.

Seedlings measured on Friday (invented data)



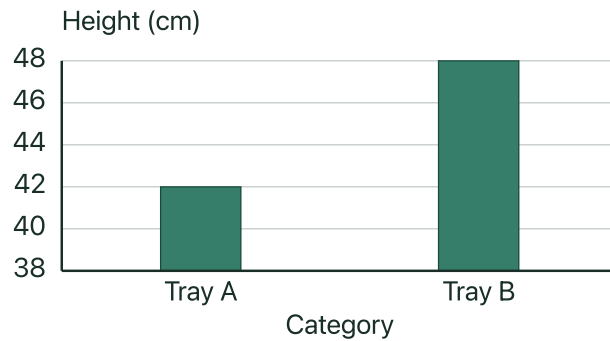
Vertical axis begins at 38, not zero.

Worked solution 2: 6 cm.

1. Tray A is 42 cm and Tray B is 48 cm.
2. $48 - 42 = 6$ cm.

3. A caption says 'Tray B is two and a half times as tall as Tray A.' Explain how the cropped bars create this impression, then find the actual height ratio.

Seedlings measured on Friday (invented data)



Vertical axis begins at 38, not zero.

Worked solution 3: The visible-height ratio is $10/4 = 2.5$; the actual ratio is $48/42 = 8/7$, about 1.14.

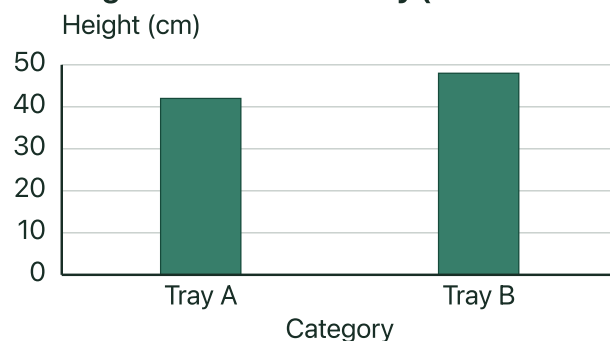
1. Above 38 cm, the bars represent $42 - 38 = 4$ and $48 - 38 = 10$.
2. $10 \div 4 = 2.5$ describes these cropped lengths, not the seedlings.
3. Using full heights gives $48/42 = 8/7 \approx 1.14$. The caption is false.

4. Redraw the seedlings graph with a zero baseline and a uniform scale reaching at least 48 cm. Keep both values and units. Give one accurate comparison as a replacement caption.

Worked solution 4: Use bars at 42 cm and 48 cm from zero. One accurate caption is 'Tray B is 6 cm taller than Tray A.'

1. Choose a uniform scale such as 0, 10, 20, 30, 40, 50 cm.
2. Draw equal-width bars ending at 42 and 48, with labelled categories and units.
3. $48 - 42 = 6$ cm. Other accurate comparisons and uniform scales are valid.

Seedlings measured on Friday (invented data)



5. Invented survey table: Club A has 12 supporters among 20 members; Club B has 18 supporters among 40 members. A graph of supporter counts claims support is more widespread in Club B. Compare both counts and percentages. Is that conclusion justified?

Worked solution 5: Club B has more supporters, but Club A has the larger percentage: 60% versus 45%.

1. Counts: 18 is greater than 12.
2. Club A: $12/20 \times 100 = 60\%$. Club B: $18/40 \times 100 = 45\%$.
3. The groups differ in size. If 'more widespread' means a larger share of members, the claim is not justified.

6. A school has 300 students. At a lunchtime chess club, 24 of 30 students surveyed prefer chess to running. A poster says '80% of the school prefers chess.' Check the percentage and explain the sampling problem. Suggest a better way to investigate the school-wide question.

Worked solution 6: $24/30 = 80\%$ of those surveyed, not established as 80% of the school. The chess-club sample may favour chess.

1. $24 \div 30 \times 100 = 80\%$, so the sample calculation is correct.
2. Students attending chess club are not a representative sample of all 300 students.
3. Survey all students, or randomly select students across the school using the same neutral question. Report responses and non-responses; do not invent the result.