

Cumulative Frequency

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Frequencies for the 80 homework times are 6, 14, 24, 20, 12, 4 (classes 0–10, 10–20, ..., 50–60 minutes). Write the cumulative frequencies.

Step 1 · Running totals

6, 20, 44, 64, 76, 80

Answer: 6, 20, 44, 64, 76, 80

Check: The last value equals the total, 80 ✓

2. Now try one with the steps

Estimate the median homework time from the graph.

Step 1 · $\frac{1}{2} \times 80$

Step 2 · Between (20, 20) and (30, 44)

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Apple masses (g): 100–120: 10, 120–140: 20, 140–160: 40, 160–180: 20, 180–200: 30. Write the cumulative frequencies. [2]

2. For the apple data, at what mass do you plot the cumulative frequency 30? [1]

3. How many apples are there in total? [1]

4. At what cumulative frequency do you read off the median of the apple data? [1]

5. Using straight lines between points, estimate the median apple mass, in g. [2]

6. Estimate the lower quartile of the apple masses, in g. [2]

7. Estimate the upper quartile of the apple masses, in g. [2]

8. Find the interquartile range of the apple masses, in g. [1]

9. Estimate how many apples weigh 170 g or less. [2]

10. Estimate how many apples weigh more than 170 g. [2]

11. Apples over 190 g are graded 'large'. Estimate the percentage that are large, in %. [3]

12. Estimate the 90th percentile of the apple masses (cf 108), in g. [3]

13. Why is the IQR often better than the range for comparing spread? [1]

14. A second orchard has median 162 g and IQR 25 g. Compare it with the first orchard (median 155 g, IQR 40 g). [2]

15. Why are cumulative frequency points plotted at the upper class bound?

[1]

4. Before you hand it in

Plotting at the midpoint of each class

Cumulative frequency is plotted at the UPPER class bound.

Median at $cf (n + 1) \div 2$ for grouped data

For a cumulative frequency graph use $n \div 2$ (and $n \div 4$, $3n \div 4$).

Giving the cf instead of the value

Go across from the cf axis to the graph, then DOWN to read the value on the horizontal axis.

Answering 'more than' with the cf itself

Cumulative frequency is 'less than or equal to'. For 'more than', subtract from the total.