

Pack B • Fluency

Answer all questions. Show your working. Questions are grouped by challenge level.

1. Find the mode of: 4, 6, 4, 8, 6, 4, 2. Justify by stating how many times it appears compared to all other values.

2. Find the median of: 9, 3, 7, 1, 5. Explain what you had to do before finding the middle value and why.

3. Three numbers have a mean of 6. Two of the numbers are 3 and 7. Find the third number and justify using the definition of mean.

4. Find the range of: 20, 7, 15, 2, 11. Explain what the range tells us about the spread of the data.

5. A bar chart shows books read: Fiction 20, Non-fiction 9, Comics 7. A student says "Fiction is more than double Non-fiction." Is this correct? Justify.

6. A frequency table shows favourite colours: Red = 10, Blue = 7, Green = 9, Yellow = 4. (a) How many students were surveyed? (b) Is "favourite colour" categorical or numerical data? Justify.

7. A shoe-size frequency table shows: Size 5: 6; Size 6: 11; Size 7: 4; Size 8: 1 students. State the mode and explain why it is called the modal size.

8. Find the median of: 8, 2, 14, 6, 10, 4. Explain why you average the two middle values instead of picking just one.

9. A pie chart shows how 40 students travel to school: Walking = 20, Bus = 12, Car = 8. What fraction walk? Justify that the fractions for all groups must add to 1.

10. A bar chart is drawn for: Mon = 5, Tue = 10, Wed = 15, Thu = 5. A student wants the vertical axis to go up in steps of 3. Explain why this is a poor choice and suggest a better scale step. Justify.

11. A frequency table shows scores out of 10: Score 5: 5 students; Score 7: 4 students; Score 9: 1 students. Find the mean score.
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12. Find the median of this data set: 22, 6, 18, 4, 30, 12, 8, 26, 14, 20, 10.
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13. Two classes sit a spelling test. Class A scores: 5, 7, 6, 8, 4. Class B scores: 2, 9, 8, 7, 4. Compare the means and ranges of the two classes.
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14. A survey of 40 people found 15 prefer comedy films. What angle (in degrees) should the comedy sector be in a pie chart?
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15. A two-way table shows student choices. Year 7: Swimming 12, Tennis 18, Total 30. Year 8: Swimming 15, Tennis 5, Total 20. How many students play tennis altogether?
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16. The mean of four numbers is 10. Three of them are 7, 12, 9. Find the fourth number.
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17. A pie chart for 48 students has a sector of 90° for "Football". How many students chose Football?
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18. For the data set 5, 2, 5, 8, 2, 5, 6, 8, find (a) the mode and (b) the median.
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19. Five plants are measured (cm): 8.2, 11.5, 9.8, 12.1, 10.4. Find the mean height, rounding to 1 decimal place.
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20. A bar chart shows daily visitors to a café over 5 days: Mon 30, Tue 70, Wed 60, Thu 50, Fri 40. Calculate the mean number of daily visitors.
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21. The mean of 6 test scores is 72. 5 of the scores are 60, 75, 80, 68, 73. Find the missing score.
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22. A pie chart has a sector of 72° . (a) What fraction of the data does it represent? (b) What percentage?
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23. Team A sprint times (s): 9.8, 10.4, 10.2, 9.6, 10.0. Team B sprint times (s): 8.9, 11.7, 10.3, 9.1, 10.0. Compare the two distributions using the mean and range.
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24. 8 friends share a total of 64 sweets equally. Then 24 more sweets are added and shared equally among the same group. How many sweets does each person have now?
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25. Eight students score: 2, 3, 3, 4, 4, 4, 5, 30. (a) Find the mean, median, and mode. (b) Which average best represents the data? Explain.
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26. A survey of 80 people found: Category A = 30, Category B = 20, Category C = 30. Calculate the angle for each sector to draw a pie chart.
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27. The mean of seven numbers is 15. Six of the numbers have a sum of 89. Write and solve an equation to find the seventh number.
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28. A pie chart shows that 45% of 80 students chose Science as their favourite subject. How many students is that?
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29. A company has 8 employees. The 2 managers each earn £90000; the remaining 6 staff each earn £15000. (a) Calculate the actual mean salary. (b) Explain why the mean might be misleading as a "typical" salary.
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30. A data set has 5 whole numbers. The mode is 4, the range is 10, and the mean is 6. Write one possible data set.
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31. Five positive integers have mean 9, median 8, and range 10. List one possible set of numbers.
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32. Daily temperatures ($^{\circ}\text{C}$) for one week: $-4, 1, -2, 6, -5, 3, -1$. Find the mean and range.
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33. A market stall records daily profit (+) or loss (–) in £ over 5 days: 60, -25 , 40, -15 , -10 . Find the mean daily profit/loss.
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34. A student has sat 5 assessments with a current mean of 60. She wants her overall mean to be 65 after a total of 8 assessments. What total must she score across the remaining 3 assessments?
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35. Two archers each shoot 6 arrows. Archer A distances from bullseye (cm): 4, 6, 5, 7, 4, 4. Archer B: 1, 10, 2, 9, 1, 7. Compare using mean and range, and state which archer you would pick for a competition.
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36. A class of 50 students chose a sport. Results: Football = 20, Tennis = 10, Swimming = 15, Other = 5. Calculate the angle and percentage for each sector.
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37. The sum of 15 data values is 225. Without dividing, use prime factorisation to check whether the mean will be a whole number. Then calculate the mean.
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38. A pie chart shows how a school spends its budget of £150000. Teaching staff = 50%, Resources = 25%, Premises = 15%, Other = 10%. (a) Calculate the amount spent on each category. (b) What angle represents Premises in the pie chart?
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39. Lengths of 40 leaves are grouped: 0–4 cm: 8 leaves; 4–8 cm: 22 leaves; 8–12 cm: 10 leaves. Use midpoints to estimate the mean length.
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40. A data set is: $x, 5, 11, 2x, 9$. The mean of the data set is 8. Form an equation and solve it to find x .
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