JUNIOR CYCLE MATHS · FREE REVISION SHEET

Statistics: graphs & averages

↗ Léim

Learning outcomes (2018 specification): SP.3d, SP.3e, SP.3f, SP.3g, SP.3h. Play the game: **leim.ie/average-ace.html**

1. Three averages and the range

Mean
total ÷ how many
3, 5, 8, 8 → 24 ÷ 4 = 6

Median
in ORDER, the middle
3, 5, 8, 8 → 6.5

Mode
most often
3, 5, 8, 8 → 8

Range
biggest − smallest
8 − 3 = 5 (spread)

Missing value: mean 7 of 5 numbers → total 35; subtract the ones you know. **New value:** new total ÷ new count.

2. From a frequency table

Goals (x)	0	1	2	3
Matches (f)	2	5	2	1

Mean = Σfx ÷ Σf = 12 ÷ 10 = 1.2. **Mode** = the value with the biggest frequency (1, not 5). **Median**: count down to values 5 and 6 → 1.

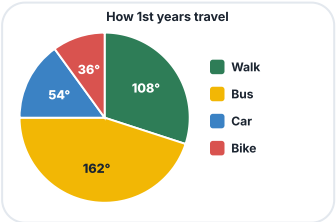
Grouped data (0–10, 10–20…): use the **mid-interval** values (5, 15…) to **estimate** the mean. "10–20" means at least 10, less than 20.

3. Which display?

Bar chart: compare categories. **Pie chart**: parts of one whole. **Line plot**: a few small numbers, one dot each. **Histogram**: lots of numerical data in equal classes (bars touch). **Stem-and-leaf**: keeps every value, in order, with a key. **Back-to-back**: compares two groups.

4. Pie chart angles

360° ÷ total = degrees for one person. 20 students: 18° each, so Bus 9 × 18° = 162°. Angles add up to 360°.



5. Stem-and-leaf plots

Boys		Girls
8 4 1	1	6
5 5 2	2	3 7 9
6 1	3	2 4 4 8
	4	5

Key: 5 | 2 | 3 = 25 for Boys and 23 for Girls

Tens on the stem, units as leaves, **in order**, with a key. In a back-to-back plot the left leaves get bigger going **outwards**: 5 | 2 is 25. Boys' median 23.5, Girls' 32.

6. Comparing two groups

Give an **average** and the **range** for each, then say what they mean in words: "The girls did better on average, and their marks were less spread out."

7. Misleading charts

Watch for: a vertical axis that **doesn't start at 0**, **uneven gaps** on a scale, a pie chart whose parts don't add to **100%**, 3-D slices, pictures that grow both ways.

8. Samples have limits

"8 of my 10 friends like it" describes your 10 friends, not all students in Ireland. A small or non-random sample can't support a big claim. Say what limits your conclusion.

Classic mistakes: median without ordering · the median's position instead of its value · the frequency as the mode · Σfx ÷ number of rows · reading the left side of a back-to-back plot backwards · pie angles that don't make 360°.

Exam tip: show the total and what you divide by; when you compare, use numbers AND words; give every chart a title, labelled axes and (for stem-and-leaf) a key.

PRACTICE · 34 QUESTIONS

Have a go

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A. Averages

1. Find the mean of 4, 7, 9, 3, 7. _____
2. Find the median of the numbers in question 1. _____
3. Find the mode of the numbers in question 1. _____
4. Find the range of the numbers in question 1. _____
5. Find the median of 12, 5, 9, 15, 8, 10. _____
6. The mean of six numbers is 11. Five of them are 9, 14, 8, 12, 10. Find the sixth. _____
7. Aoife's mean mark over 4 tests is 70. She gets 85 in the 5th test. What is her new mean? _____
8. Which average is the only one you can use for favourite colours? _____
9. Weekly pocket money (€): 8, 10, 9, 12, 11, 90. Which average gives the best typical value, and what is it? _____
10. The numbers 3, 5, 7, 9 have a mean of 6. The number 6 is added. What happens to the mean? _____

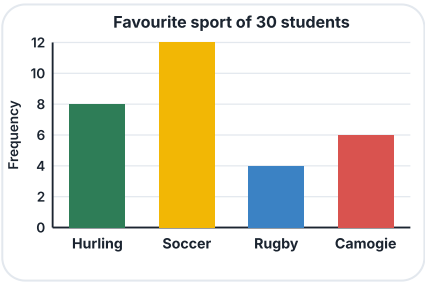
B. Frequency tables

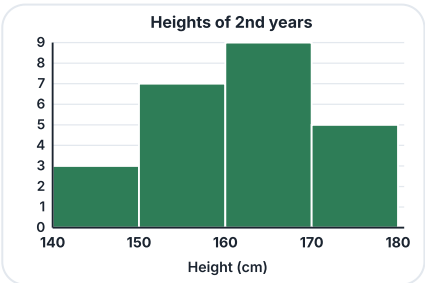
Goals	0	1	2	3	4
Matches	3	6	5	4	2

Time (min)	0–10	10–20	20–30	30–40
Students	3	7	8	2

11. How many matches are in the table? _____
12. What is the mode? _____
13. What is the median? _____
14. What is the mean number of goals? _____
15. Use mid-interval values to estimate the mean homework time. _____
16. What is the modal class of the homework times? _____

C. Charts





17. How many students chose soccer? _____
18. How many students are in the survey? _____
19. How many more chose hurling than rugby? _____
20. What is the mode? _____
21. What percentage chose camogie? _____
22. In a pie chart of the same data, what is the angle for hurling? _____
23. What is the angle for soccer? _____
24. How many students are shown in the histogram? _____
25. What is the modal class? _____
26. How many students are at least 160 cm tall? _____

D. Stem-and-leaf (marks out of 80)

3	1 5 8
4	2 4 4 7
5	0 3 6 8
6	1 4 7
7	2

Key: 4 | 2 = 42 marks

27. What is the median mark? _____
28. What is the range? _____
29. What is the mode? _____
30. How many students scored more than 55? _____

Questions 31–34 are on the next page.

EXAM-STYLE · THEN CHECK

Exam corner + answers

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E. Exam-style questions (show your work)

31. **Two classes.** The back-to-back stem-and-leaf plot shows the marks two classes got in a quiz. (a) Find the median and the range for each class. (b) Compare the two classes, using your answers.

Class A		Class B
	1	8
8 5 1	2	2 7 9
6 6 4 2	3	0 1 3 5 8
8 5 1	4	
2	5	

Key: 5 | 2 | 2 = 25 for Class A and 22 for Class B

32. **Getting to the concert.** 60 people said how they got to a concert: Bus 21, Car 18, Train 12, Walk 9. (a) Find the angle for each sector of a pie chart. (b) What percentage came by train? (c) Draw the pie chart.

33. **Means and outliers.** (a) The mean of five numbers is 12. A sixth number is added and the mean becomes 13. Find the sixth number. (b) Explain why the mean of 2, 3, 3, 4, 48 is not a good typical value, and give a better one.

34. **Visitors.** The bar chart shows the visitors to two museums last Sunday. (a) How many visitors did each museum have? (b) A newspaper says "Museum B had four times as many visitors as Museum A". Why does the chart make it look that way? Is it true? (c) How should the chart be drawn?



Answers

A	1. 6 · 2. 7 · 3. 7 · 4. 6 · 5. 9.5 · 6. 13 · 7. 73 · 8. Mode · 9. Median, €10.5 · 10. It stays the same (6)
B	11. 20 · 12. 1 goal · 13. 2 · 14. 1.8 · 15. 19.5 minutes · 16. 20–30
C	17. 12 · 18. 30 · 19. 4 · 20. Soccer · 21. 20% · 22. 96° · 23. 144° · 24. 24 · 25. 160–170 cm · 26. 14
D	27. 50 · 28. 41 · 29. 44 · 30. 6
E	31. (a) Class A: median **36**, range **31**. Class B: median **30**, range **20**. (b) Class A did better on average (higher median) but their marks were more spread out (bigger range). · 32. (a) 360° ÷ 60 = 6° each: Bus **126°**, Car **108°**, Train **72°**, Walk **54°** (360° ✓) (b) 12/60 = **20%** (c) sectors drawn with a protractor, labelled, with a title · 33. (a) 6 × 13 − 5 × 12 = **18** (b) The mean is 12, dragged up by the outlier 48; the **median, 3**, is typical. · 34. (a) A **105**, B **120** (b) The vertical axis starts at **100**, not 0, so B's bar (20 above 100) looks 4 times A's (5 above 100). Not true: B had only 15 more, about 14.3% more. (c) Start the axis at 0 with equal steps.

Got one wrong? Check: did you put the values in order before finding the median? Did you give the value (not the frequency) as the mode? Did you divide Σfx by the total frequency? Then play **Average Ace** at leim.ie/average-ace.html: the "Go back over these" list at the end shows the rule for each mistake.

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