

Grouping data and class intervals

About 55 minutes Calculator allowed 43 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/stats-grouping-data-and-class-intervals/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** From chapter 1 [2 marks]
- For each of these, write qualitative, discrete or continuous, and give a reason.
(i) the number of pages in a book (ii) the length of a phone call
- Pia writes this hypothesis:
"Older trees have better trunks." Explain why it is not a suitable hypothesis, and write a better one.

- A3** Maths skill [2 marks] **A4** Maths skill [2 marks]
- $M(1, 4)$ is the midpoint of $A(6, -5)$ and B . Find the coordinates of B .
- Round 0.5981 to 2 significant figures.

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Ten leaf lengths, in cm, are
5.3, 6.0, 7.4, 8.9, 4.6, 6.2, 9.5, 8.0, 5.9, 7.1
Find the frequency of each class: $4 < l \leq 6$,
 $6 < l \leq 8$, $8 < l \leq 10$.

Hint $6 < l \leq 8$ means more than 6, up to and including 8.

- B1** Ten parcel masses, in kg, are [2 marks]
1.8, 2.0, 3.6, 5.2, 4.0, 0.9, 2.7,
4.4, 3.1, 6.0
Find the frequency of each
class: $0 < m \leq 2$, $2 < m \leq 4$,
 $4 < m \leq 6$.

Answer

EXAMPLE 2

Asha's classes for waiting times, in minutes, are 0–10, 10–20, 20–30. Explain what is wrong, and write better classes.

Hint Where does a time of exactly 10 minutes go?

EXAMPLE 3

Find the width and the midpoint of the class $15 < t \leq 25$.

Hint Width: top minus bottom. Midpoint: halfway between.

EXAMPLE 4

A table of salaries, in £1000s, uses classes $10 < s \leq 20$, $20 < s \leq 30$, $30 < s \leq 60$. Why might the last class be wider?

Hint Are there many salaries above £30 000?

EXAMPLE 5

From the table of 32 apple masses, how many are more than 70 g? Can you say how many are more than 75 g?

Mass, m (g)	Frequency
$50 < m \leq 60$	8
$60 < m \leq 70$	15
$70 < m \leq 80$	9

Hint Which values can you see, and which are hidden inside a class?

B2 Rob's classes for heights, in cm, are [2 marks]

$150 < h < 160$, $160 < h < 170$,
 $175 < h \leq 185$.

Give two problems with his classes.

B3 Find the width and the midpoint of the class [2 marks]

$2.5 < m \leq 4$.

Answer Width Midpoint

B4 A gym's table of members' ages has classes [2 marks]

$16 < a \leq 20$,
 $20 < a \leq 40$, $40 < a \leq 50$. Lucy says, "The $20 < a \leq 40$ class has the most members, so those ages are the most common." Why might Lucy be wrong?

B5 24 people give their journey time to work. How many took [3 marks]

more than 30 minutes? Can you say how many took more than 40 minutes? Explain.

Time, t (minutes)	Frequency
$0 < t \leq 15$	6
$15 < t \leq 30$	11
$30 < t \leq 45$	7

C Practice

- C1** A value of exactly 6 is recorded. [1 mark]
Which class does it go in:
 $0 < x \leq 6$ or $6 < x \leq 12$?

Answer

- C2** Write the class "more than 20 seconds, up to and including 30 seconds" using t and inequality signs. [1 mark]

Answer

- C3** Write down the modal class of these leaf widths. [1 mark]

Width, w (mm)	$30 < w \leq 40$	$40 < w \leq 50$	$50 < w \leq 60$
Frequency	5	12	9

Answer

- C4** Goals scored in a season are grouped 1–5, 6–10, 11–15. Explain why the gap between 5 and 6 does not matter. [1 mark]

- C5** Puzzle times range from 12 to 58 seconds. Write five equal classes for them, starting at 10 seconds. [2 marks]

- C6** 18 runners have times in $20 < x \leq 40$ minutes. Assuming the times are spread evenly, estimate how many took between 20 and 30 minutes. [2 marks]

Answer

D Exam-style questions

- D1** Ola groups the ages of people at a concert as 10–20, 20–30, 30–40, 40–60. She says, "Every person fits in exactly one class." [2 marks]

Is Ola right? Give a reason.

- D2** A courier records the masses of 60 parcels.

Mass, m (kg)	Frequency
$0 < m \leq 1$	14
$1 < m \leq 2$	22
$2 < m \leq 5$	18
$5 < m \leq 10$	6

- (a) Write down the width of the class $2 < m \leq 5$. [1 mark]

Answer

- (b) Assuming the masses are spread evenly in each class, estimate how many parcels are more than 2 kg and at most 3 kg. [2 marks]

Answer

- (c) Give one reason why the courier used unequal class widths. [1 mark]

- (d) The courier says the heaviest parcel was 10 kg. Explain why the table does not show this. [2 marks]

Total for D2: 6 marks

- D3** Josh will time 30 students solving a puzzle. He expects times between 20 and 95 seconds. His classes are: 0–20, 20–40, 40–60, more than 60. Assess Josh's classes. [4 marks]

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** 20 students record the number of books they read in a year. Sian says, "From this table the mean is 9 books." Show that Sian must be wrong. [4 marks]

Books read	0 to 4	5 to 9	10 to 14
Students	6	9	5

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Find the greatest the mean could be.
Hint 2 Give every student the top of their class: 4, 9 or 14 books.
Hint 3 Greatest total $6 \times 4 + 9 \times 9 + 5 \times 14 = 175$. Divide by 20 and compare with 9.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can sort data into inequality classes with no gaps or overlaps. ☐ ☐ ☐

I can find widths and midpoints and explain unequal widths. ☐ ☐ ☐

I can say what a grouped table hides. ☐ ☐ ☐