

Two-way tables and summarising data

About 55 minutes    Calculator allowed    43 marks



Hints online, answers free with an account:  
mathswariz.uk/worksheets/stats-two-way-tables-and-summarising-data/

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 2

[2 marks]

After a 30% increase, the price of a bike is £208. What was the price before the increase?

20 mice in a barn are marked. A second catch of 36 mice is taken. The estimate of the number of mice is 180. How many of the second catch were marked?

Answer .....

**A3**

Last lesson

[2 marks]

**A4**

Maths skill

[2 marks]

For a set of journey times, the lower quartile is 45 minutes and the upper quartile is 65 minutes. Using the  $1.5 \times \text{IQR}$  rule, is a value of 18 minutes an outlier? Show your working.

$x^2 = 36$  and  $y^3 = -125$ . Find the smallest possible value of  $x + y$ .

Answer .....

**B** Example, then your turn

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

**EXAMPLE 1**

The table shows the lunch choices of 175 students: a hot meal, a sandwich or a packed lunch. Complete the table.

|       | Hot meal | Sandwich | Packed | Total |
|-------|----------|----------|--------|-------|
| Boys  | 34       | ?        | 21     | 92    |
| Girls | ?        | 29       | ?      | ?     |
| Total | 61       | ?        | 48     | 175   |

**Hint** Find a row or column with one gap, and use its total.

**B1**

The table shows how the 260 members of a gym pay: monthly, annually or per visit. Complete the table.

|             | Monthly | Annual | Per visit | Total |
|-------------|---------|--------|-----------|-------|
| Under 30    | 48      | ?      | ?         | ?     |
| 30 and over | ?       | 62     | ?         | 140   |
| Total       | 91      | 103    | 66        | 260   |

Answer .....

**EXAMPLE 2**

240 people visited a library on Saturday. Each borrowed one book, fiction or non-fiction. 130 borrowed fiction. 96 of the visitors were adults, and 58 adults borrowed non-fiction. How many children borrowed fiction?

**Hint** Draw a two-way table and fill in what you are told.

**EXAMPLE 3**

How some Year 7 and Year 11 students get to school. (a) What percentage of the Year 7 students walk? (b) What percentage of the walkers are in Year 7?

|         | Walk | Bus | Car | Total |
|---------|------|-----|-----|-------|
| Year 7  | 36   | 54  | 30  | 120   |
| Year 11 | 45   | 63  | 42  | 150   |
| Total   | 81   | 117 | 72  | 270   |

**Hint** The group asked about gives the denominator.

**EXAMPLE 4**

At School P, 48 of the 160 students cycle to school. At School Q, 63 of the 252 students do. Eli says, "Cycling is more popular at School Q, as more students cycle there." Is Eli correct? Give a reason.

**Hint** The schools are different sizes: compare percentages.

- B2** A vet saw 180 cats and dogs last month. 104 of them were dogs. 75 of the animals had an injection. 41 cats did not have an injection. How many dogs had an injection? [3 marks]

Answer .....

- B3** The table shows the people who watched two films at a cinema on Sunday. What fraction of the children watched Film A? Give your answer in its simplest form. [2 marks]

|        | Adults | Children | Total |
|--------|--------|----------|-------|
| Film A | 84     | 56       | 140   |
| Film B | 66     | 154      | 220   |
| Total  | 150    | 210      | 360   |

Answer .....

- B4** Last week 49 of the 350 patients at Clinic X waited over an hour, and 35 of the 220 at Clinic Y. Leah says, "Clinic X has the bigger problem, as more of its patients waited over an hour." Is Leah correct? Give a reason. [3 marks]

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**EXAMPLE 5**

Passengers rated a train company. Trains on time: 360 replies, 64% satisfied. Seats: 75 replies, 91% satisfied. Wi-fi: 150 replies, 72% satisfied. Which percentage is the most reliable? Give a reason.

**Hint** Count the replies behind each percentage.

**B5** Members rated a sports centre. Pool: 48 replies, 94% good. Gym: 310 replies, 71% good. Café: 126 replies, 83% good. Mo says the pool's percentage is the most reliable, as it is the highest. Is Mo correct? Give a reason.

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**C Practice**

- C1** 200 students each chose French or Spanish. 45% of them are boys, and 40% of the boys chose French. 66 girls chose Spanish. How many students chose French? [3 marks]
- C2** In January a café sold 640 teas, 520 coffees and 210 hot chocolates. Toby says, "Tea is the café's best-selling drink all year." Give one reason why these data may not support Toby. [1 mark]

Answer .....

- C3** At a sports day, every student did a race or a field event, not both. 35% of the runners are girls, and 63 runners are girls. 120 students did a field event. How many students were there? [2 marks]
- C4** Sian records the year group (7 or 8) and the way to school (W = walk, B = bus, C = car) of 10 students: 7W, 8B, 7B, 7W, 8C, 8W, 7B, 8B, 7C, 8B. Show these data in a two-way table, with totals. [2 marks]

Answer .....

**D Exam-style questions**

- D1** A theatre sold 400 tickets for a show. 35% of the tickets were sold to children. 90 adults sat in the circle. The other adults, and 104 children, sat in the stalls. Jon says, "A greater proportion of the children than of the adults sat in the circle." [4 marks]

Is Jon correct? You must show your working.

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**D2** A council surveyed homes in two towns about the main type of heating they use. The table shows the results.

| Town  | Gas | Electric | Oil | Other | Total |
|-------|-----|----------|-----|-------|-------|
| Ashby | 312 | 96       | 48  | 24    | 480   |
| Brook | 154 | 77       | 28  | 21    | 280   |

(a) Work out the percentage of homes in Brook that use electric heating. [2 marks]

Answer .....

(b) Compare the types of heating used in Ashby and in Brook. [3 marks]

(c) Explain why the percentages for Ashby are more reliable than the percentages for Brook. [1 mark]

Total for D2: 6 marks

**E Extension**

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

**E1**

A club has junior members and senior members. There are 60 more seniors than juniors. 15% of the juniors and 35% of the seniors voted for a new club kit. Altogether, 27% of the members voted for the new kit. How many members does the club have?

[4 marks]

Answer .....

**Extension hints**

Cover these with paper. Uncover one at a time.

- E1**

**Hint 1**

Let  $j$  be the number of juniors. Write the number of seniors in terms of  $j$ .

**Hint 2**

The votes:  $0.15j + 0.35(j + 60) = 0.27(2j + 60)$ .

**Hint 3**

$0.5j + 21 = 0.54j + 16.2$ , so  $0.04j = 4.8$  and  $j = 120$ . Seniors = 180, so there are 300 members. Check:  $18 + 63 = 81$ , which is 27% of 300.

**How did it go?**

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

- I can complete a two-way table and read fractions and percentages from it, using the right total.
- I can compare groups of different sizes using percentages, and say which percentage is the most reliable.