



# Two-way tables

Year 8 About 60 minutes No calculator 45 marks

Date \_\_\_\_\_

## A Do Now

Quick questions to start.

A1

Last lesson

[1 mark]

As the temperature goes up, sales of hot drinks go down. What type of correlation is this?

Answer .....

A2

Needed today

[1 mark]

A bag holds 7 red counters and 13 blue counters. One is taken at random. What is the probability that it is red?

Answer .....

A3

Needed today

[1 mark]

Write 27 out of 60 as a percentage.

Answer .....

A4

From chapter 2

[1 mark]

Expand  $4(2x - 3)$ .

Answer .....

## B Example, then your turn

Year 8

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

### EXAMPLE 1

The two-way table shows where 60 students chose to go on a trip. Complete the table.

|        | Boys | Girls | Total |
|--------|------|-------|-------|
| Zoo    | 12   |       | 25    |
| Museum |      | 8     | 17    |
| Beach  | 9    |       |       |
| Total  | 30   |       | 60    |

**Hint** Start with a row or a column that has only one gap.

B1

The two-way table shows how 70 students in Year 7 (Y7) and Year 8 (Y8) have lunch. Work out the numbers  $a$ ,  $b$ ,  $c$  and  $d$ .

[3 marks]

| Lunch  | Y7  | Y8  | Total |
|--------|-----|-----|-------|
| Hot    | $a$ | 15  | 33    |
| Packed | 14  | $b$ | 29    |
| Home   | 6   | $c$ |       |
| Total  | 38  | $d$ | 70    |

Answer  $a = \dots$   $b = \dots$   $c = \dots$   $d = \dots$

**EXAMPLE 2**

The table shows the pets of 50 students. A student is picked at random. Work out the probability that the student is (i) a girl with a cat, (ii) without a dog.

|       | Boys | Girls | Total |
|-------|------|-------|-------|
| Dog   | 9    | 7     | 16    |
| Cat   | 6    | 11    | 17    |
| None  | 10   | 7     | 17    |
| Total | 25   | 25    | 50    |

**Hint** The probability is the number who fit, out of the 50 students.

**EXAMPLE 3**

The table shows the cost of sending a parcel by its weight in kg (1 to 2 means over 1 and up to 2). Mo sends parcels of 0.6 kg and 1.8 kg by standard post. How much would he save by sending them as one parcel?

| Weight  | Standard | Express |
|---------|----------|---------|
| up to 1 | £3.20    | £6.50   |
| 1 to 2  | £4.60    | £8.00   |
| 2 to 5  | £6.90    | £11.40  |

**Hint** Work out the cost of the two parcels on their own, then the cost of one parcel of  $0.6 + 1.8$  kg.

- B2** The table shows the activity that each of 80 people at a club chose (None means neither). A person is picked at random. Work out the probability that the person is a child who does not swim. [2 marks]

|        | Adult | Child | Total |
|--------|-------|-------|-------|
| Tennis | 8     | 14    | 22    |
| Swim   | 12    | 21    | 33    |
| None   | 20    | 5     | 25    |
| Total  | 40    | 40    | 80    |

Answer .....

- B3** Use the table in Example 3. Ria sends parcels of 0.7 kg and 2.6 kg by express post. How much would she save by sending them as one parcel? [2 marks]

Answer £.....

**EXAMPLE 4**

There are 80 people at a concert. 45 are women. 28 of the men are over 30. 31 of the people are aged up to 30. How many of the women are over 30?

**Hint** Draw a two-way table: men and women across, over 30 and up to 30 down. Fill in the facts, then the gaps.

- B4** Year 8 has 120 students. 54 are boys. Each studies French or Spanish. 41 girls study French. 63 students study Spanish. How many boys study French? [3 marks]

Answer .....

## **c Practice**

Year 8

- C1** The table shows the percentage of boys and the percentage of girls who own a phone, at each age. Comment on the difference between boys and girls, and on the trend as age goes up. [2 marks]

| Age | Boys | Girls |
|-----|------|-------|
| 9   | 35   | 40    |
| 10  | 52   | 58    |
| 11  | 70   | 77    |
| 12  | 85   | 91    |

- C2** Part of a bus timetable is shown. Kai is at the Library. He must be at the Station by 9:05. Write down the latest time he can catch a bus at the Library, and how long his journey takes. [2 marks]

| Bus     | A    | B    | C    |
|---------|------|------|------|
| Park    | 8:05 | 8:35 | 9:10 |
| Library | 8:17 | 8:47 | 9:22 |
| Station | 8:31 | 9:01 | 9:36 |

Answer .....

- C3** The chart shows the distances in miles between four towns. Work out the length of a trip from Ayton to Cole to Dale and back to Ayton. [2 marks]

|      | Ayton | Bury | Cole |
|------|-------|------|------|
| Bury | 34    |      |      |
| Cole | 52    | 27   |      |
| Dale | 41    | 63   | 38   |

- C4** The table shows the bikes sold each month by shops A and B. In which month was the difference between them greatest? Give the difference. [2 marks]

| Shop | Jan | Feb | Mar | Apr | May |
|------|-----|-----|-----|-----|-----|
| A    | 46  | 51  | 63  | 58  | 70  |
| B    | 39  | 55  | 49  | 77  | 66  |

Answer .....

Answer ..... miles

**D1**

The two-way table shows the favourite sport of some students. Sam says, "More boys than girls chose football, so a boy is more likely to choose football than a girl."

[3 marks]

Use the table to show that Sam is wrong.

|       | Football | Other | Total |
|-------|----------|-------|-------|
| Boys  | 40       | 40    | 80    |
| Girls | 30       | 20    | 50    |
| Total | 70       | 60    | 130   |

**D2**

A café sold 150 drinks one day. Each drink was a tea or a coffee, small or large. 64 of the drinks were coffee. 52 of the teas were large. 39 of the drinks were small coffees.

(a) Complete the two-way table.

[3 marks]

|       | Tea | Coffee | Total |
|-------|-----|--------|-------|
| Small |     |        |       |
| Large |     |        |       |
| Total |     |        |       |

(b) A drink is picked at random. Work out the probability that it is a large coffee or a small tea.

[2 marks]

Answer .....

Total for D2: 5 marks

**D3**

The table shows the prices of one swim at a pool. A family of two adults aged 38 and 41, two children aged 9 and 13, and a grandparent aged 66 want to swim. How much would they save by swimming at an off-peak time instead of a peak time? You must show your working.

[4 marks]

| Age         | Off-peak | Peak  |
|-------------|----------|-------|
| Under 16    | £2.40    | £3.10 |
| 16 to 59    | £4.20    | £5.60 |
| 60 and over | £2.80    | £3.50 |

Answer £.....

**D4** The table shows the heights of 40 boys and 40 girls.

(a) Write down the modal class for the boys [2 marks] and for the girls.

| Height (cm) | Boys | Girls |
|-------------|------|-------|
| 140–149     | 2    | 6     |
| 150–159     | 9    | 15    |
| 160–169     | 15   | 12    |
| 170–179     | 10   | 6     |
| 180–189     | 4    | 1     |

Answer .....

(b) Make two comparisons between the heights of the boys and the heights of the girls. [2 marks]

(c) A girl is picked at random. Work out the probability that she is under 160 cm tall. [2 marks]

Answer .....

Total for D4: 6 marks

**E Extension**

Stretch

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

**E1** A club has 108 members. The ratio of men to women is 4 : 5.  $\frac{3}{4}$  of the men and  $\frac{2}{3}$  of the women can swim. A member is picked at random. Work out the probability that the member cannot swim. Give your answer in its simplest form. [5 marks]

Answer .....

**Extension hints**

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Draw a two-way table: men and women, can swim and cannot swim. Fill in the totals first.
- Hint 2**  $108 \div 9 = 12$ , so there are  $4 \times 12 = 48$  men and  $5 \times 12 = 60$  women.
- Hint 3** Men who cannot swim:  $48 - 36 = 12$ . Women who cannot swim:  $60 - 40 = 20$ . So  $\frac{32}{108}$ , then simplify.

**How did it go?**

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

I can complete a two-way table from what I am told. ☐ ☐ ☐

I can work out a probability from a two-way table. ☐ ☐ ☐

I can read and compare the data in a two-way table, timetable or chart. ☐ ☐ ☐