

Two-Way Tables

Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (5 marks)

The table shows when 120 visitors arrived at a museum one day.

	Morning	Afternoon	Evening	Total
Adults	28	30	12	70
Children	20	24	6	50

- (a) What fraction of the adults arrived in the morning?
Give your answer in its simplest form.

There are 70 adults.

28 of the adults arrived in the morning.

$$\text{Fraction} = \frac{28}{70}$$

$$\text{Divide top and bottom by 14: } \frac{28}{70} = \frac{2}{5}$$

Answer: $\frac{2}{5}$

Marks: 1 mark for $\frac{28}{70}$. 1 mark for $\frac{2}{5}$.

- (b) One of the children is chosen at random.
What is the probability that this child arrived in the afternoon?

The visitor is chosen from the 50 children only.

24 of the children arrived in the afternoon.

Answer: $\frac{24}{50}$

Tip: “One of the children” means the bottom of the fraction is the number of children (50), not all 120 visitors.

- (c) What percentage of the 120 visitors arrived in the evening?

Arrived in the evening: adults 12 + children 6 = 18

$$\text{Percentage} = \frac{18}{120} \times 100$$

$$= 15$$

Answer: 15%

Marks: 1 mark for $\frac{18}{120}$. 1 mark for 15%.

2 (4 marks)

A cinema recorded the snack bought by each of 150 customers.

- (a) Complete the table.

	Popcorn	Nachos	Ice cream	Total
Adults	38		15	80
Children		12		
Total	68			150

$$\text{Adults, nachos: } 80 - 38 - 15 = 27$$

$$\text{Children total: } 150 - 80 = 70$$

$$\text{Children, popcorn: } 68 - 38 = 30$$

$$\text{Nachos total: } 27 + 12 = 39$$

$$\text{Ice cream total: } 150 - 68 - 39 = 43$$

Children, ice cream: $43 - 15 = 28$

Check the Children row: $30 + 12 + 28 = 70$ ✓

	Popcorn	Nachos	Ice cream	Total
Adults	38	27	15	80
Children	30	12	28	70
Total	68	39	43	150

Answer: See table

Tip: Look for a row or column with only one gap, and fill that first. At the end, check every row and every column adds up.

Marks: 3 marks for a fully correct table. 2 marks for 4 or 5 correct. 1 mark for 2 or 3 correct.

- (b) One of the customers is picked at random.
Work out the probability that the customer is a child who bought ice cream.

Child **and** ice cream: 28 customers (from the table).

The customer is picked from all 150 customers.

Answer: $\frac{28}{150}$

3 (2 marks)

The table shows the meals chosen by some students.

	Meat	Vegetarian	Fish
Boys	20	12	8
Girls	14	15	11

Is it true that more than half of the students who had the vegetarian meal were girls?

Tick a box.

You must show your working.

Students who had vegetarian: boys 12 + girls 15 = 27

Half of 27 is 13.5

15 girls had vegetarian, and 15 is more than 13.5.

So more than half were girls.

Answer: Yes, 15 out of 27

Marks: 1 mark for 27 (or $\frac{15}{27}$). 1 mark for Yes with correct working.

4 (4 marks)

There are 90 cars in a car park.

Each car is electric or petrol.

Each car is silver or white.

36 of the cars are electric.

40 of the cars are silver.

22 of the petrol cars are white.

(a) How many of the electric cars are silver?

You may use the table to help you.

Put the information in the table.

Petrol cars: $90 - 36 = 54$

Petrol cars that are silver: $54 - 22 = 32$

Silver cars: 40 in total.

Electric cars that are silver: $40 - 32 = 8$

	Silver	White	Total
Electric	8	28	36
Petrol	32	22	54
Total	40	50	90

Answer: 8

Marks: 1 mark for 54 petrol cars. 1 mark for 32 silver petrol cars. 1 mark for 8.

- (b) What fraction of the white cars are electric?

White cars: $90 - 40 = 50$

Electric and white: $36 - 8 = 28$

Answer: $\frac{28}{50}$

Tip: The question is only about the white cars, so the bottom of the fraction is 50, not 90.

5 (6 marks)

There are 72 chocolates in a box.

The chocolates are milk or dark and have hard or soft centres.

$\frac{5}{9}$ of the chocolates have soft centres.

There are twice as many milk chocolates as dark chocolates.

9 of the dark chocolates have soft centres.

- (a) Complete the two-way table.

Soft centres: $\frac{5}{9}$ of 72 = $72 \div 9 \times 5 = 40$

Hard centres: $72 - 40 = 32$

Milk : dark = 2:1, so there are 3 parts.

Dark: $72 \div 3 = 24$. Milk: $2 \times 24 = 48$

Dark, hard: $24 - 9 = 15$

Milk, soft: $40 - 9 = 31$

Milk, hard: $48 - 31 = 17$

	Hard centre	Soft centre	Total
Milk	17	31	48
Dark	15	9	24
Total	32	40	72

Answer: See table

Tip: “Twice as many milk as dark” is about **all** the chocolates: milk total = $2 \times$ dark total.
Fill in the totals first.

Marks: 1 mark for 40 and 32. 1 mark for 48 and 24. 1 mark for 15 or 31. 1 mark for a fully correct table.

- (b) One chocolate is chosen at random.
What is the probability that it is a dark chocolate with a soft centre?

Dark with a soft centre: 9 chocolates.

There are 72 chocolates altogether.

Answer: $\frac{9}{72}$

- (c) One chocolate is chosen at random.
What is the probability that it has a hard centre?

Hard centre (milk or dark): 32 chocolates.

There are 72 chocolates altogether.

Answer: $\frac{32}{72}$

6 (4 marks)

A theatre sold 240 tickets for a show.

Each ticket was for the stalls or the balcony.

Each ticket was an adult ticket or a child ticket.

$\frac{3}{8}$ of the tickets were for the balcony.

40% of the tickets were child tickets.

28 of the balcony tickets were child tickets.

How many adult tickets were for the stalls?

You may use the two-way table to help you.

Balcony tickets: $\frac{3}{8}$ of 240 = $240 \div 8 \times 3 = 90$

Stalls tickets: $240 - 90 = 150$

Child tickets: 40% of 240 = 96

Adult tickets: $240 - 96 = 144$

Adult balcony tickets: $90 - 28 = 62$

Adult stalls tickets: $144 - 62 = 82$

	Stalls	Balcony	Total
Adult	82	62	144
Child	68	28	96
Total	150	90	240

Answer: 82

Tip: Work out the totals first from the fraction and the percentage, then fill the gaps one at a time. Check that every row and column adds up.

Marks: 1 mark for 90 balcony (or 150 stalls). 1 mark for 96 child (or 144 adult). 1 mark for 62 adult balcony (or 68 child stalls). 1 mark for 82.