

# Frequency 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** (3 marks)

Here are the colours of 20 cars in a car park.

|        |       |        |        |       |
|--------|-------|--------|--------|-------|
| red    | blue  | silver | red    | black |
| silver | blue  | silver | red    | white |
| silver | black | silver | blue   | red   |
| silver | white | blue   | silver | red   |

(a) Complete the frequency table.

Go through the list in order and put a tally mark for each car.

Draw every fifth mark across the other four, like a gate.

| Colour | Tally | Frequency |
|--------|-------|-----------|
| Red    |       | 5         |
| Blue   |       | 4         |
| Silver |       | 7         |
| Black  |       | 2         |
| White  |       | 2         |

Check:  $5 + 4 + 7 + 2 + 2 = 20$  cars ✓

**Answer:** 5, 4, 7, 2, 2

*Marks:* 2 marks for all correct. 1 mark for three colours correct.

- (b) Write down the modal colour.

The mode is the one with the highest frequency.

Silver has the highest frequency (7).

**Answer:** Silver

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**2** (3 marks)

Ravi uses a tally chart to record the birds that visit his garden feeder in one morning.  
Each 5-bar gate (  ) represents 5 birds.

| Bird     | Tally                                                                               |
|----------|-------------------------------------------------------------------------------------|
| Sparrow  |   |
| Robin    |    |
| Blue tit |  |
| Starling |  |

- (a) How many blue tits visited the feeder?

Two 5-bar gates = 10

Plus 2 single marks

$$10 + 2 = 12$$

**Answer:** 12

- (b) Ravi says,

“More than one third of the birds that visited the feeder were sparrows.”

Is he correct? Tick a box.

Show working to support your answer.

Sparrows: three 5-bar gates and 2 more, so  $3 \times 5 + 2 = 17$

Robins: 6

Blue tits: 12

Starlings: 9

Total:  $17 + 6 + 12 + 9 = 44$  birds

One third of 44 is  $44 \div 3 = 14.66 \dots$

17 is more than 14.66...

So Ravi is correct.

**Answer:** Yes: 17 sparrows out of 44, and  $17 > 44 \div 3 = 14.7$

**Tip:** Count the single marks as well as the gates. Compare with one third of the **total**, not one third of the other birds.

*Marks:* 1 mark for the total 44 (with 17 sparrows). 1 mark for Yes with a correct comparison, e.g.  $17 > 14.7$  or  $3 \times 17 = 51 > 44$ .

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**3** (3 marks)

Here are the test marks of 15 students.

12   25   33   8   17   21   30   26   3   38   19   28   10   36   20

(a) Complete the frequency table.

1 to 10: 8, 3, 10   so 3

11 to 20: 12, 17, 19, 20   so 4

21 to 30: 21, 25, 26, 28, 30   so 5

31 to 40: 33, 36, 38   so 3

Check:  $3 + 4 + 5 + 3 = 15$  students ✓

**Answer:** 3, 4, 5, 3

*Marks:* 2 marks for all correct. 1 mark for two or three groups correct.

(b) Which group has the highest frequency?

The highest frequency in your table is 5.

This is the group 21 to 30.

**Answer:** 21 to 30

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**4** (2 marks)

Ella measures the lengths, in cm, of 20 leaves.

Here are her results.

7.2   4.1   9.8   12.6   5.6   10.3   3.9   6.7   13.1   8.3  
2.4   11.5   7.9   4.8   9.2   6.1   10.7   5.3   12.2   8.8

Ella makes this table to group the lengths.

| Length (cm) | Tally | Frequency |
|-------------|-------|-----------|
| 3 to 5      |       |           |
| 6 to 8      |       |           |
| 9 to 11     |       |           |
| 12 to 14    |       |           |

Write down **two** things that are wrong with Ella's groups.

Problem 1: there are gaps between the groups.

For example, 5.6 is more than 5 but less than 6, so it does not fit in any group.

(The same happens to 5.3, 8.3, 8.8 and 11.5.)

Problem 2: there is no group for leaves shorter than 3 cm.

2.4 has nowhere to go.

**Answer:** Gaps between groups (e.g. 5.6 has no group); no group for 2.4 (less than 3)

**Tip:** Lengths are continuous, so the groups must join up with no gaps, and cover every value, e.g.  $0 \leq l < 3$ ,  $3 \leq l < 6$ ,  $6 \leq l < 9$ , and so on.

**Marks:** 1 mark for each different correct problem.

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**5** (4 marks)

The table shows the times,  $t$  minutes, that some people waited at a doctor's surgery.

| Time, $t$ (minutes) | Frequency |
|---------------------|-----------|
| $0 < t \leq 10$     | 7         |
| $10 < t \leq 20$    | 12        |
| $20 < t \leq 30$    | 9         |
| $30 < t \leq 40$    | 2         |

- (a) Tom says a time of exactly 20 minutes goes in the class  $10 < t \leq 20$   
Is he correct? Tick a box.  
Give a reason for your answer.

$10 < t \leq 20$  means  $t$  is more than 10 and less than or equal to 20.

The  $\leq$  sign means 20 is included.

**Answer:** Yes, 20 is included because of  $\leq$

- (b) How many people waited more than 20 minutes?

More than 20 minutes means the classes  $20 < t \leq 30$  and  $30 < t \leq 40$ .

$$9 + 2 = 11$$

**Answer:** 11

**Tip:** “More than 20 minutes” covers **every** class above 20, so add the frequencies of both classes.

- (c) Which class interval contains the median?  
You must show your working.

$$\text{Total number of people} = 7 + 12 + 9 + 2 = 30$$

The median is halfway between the 15th and 16th times.

The first class holds the 1st to 7th times.

The first two classes hold  $7 + 12 = 19$  times.

So the 15th and 16th times are in the second class.

**Answer:**  $10 < t \leq 20$

**Tip:** Don't pick the middle class of the table. Add up the frequencies to find where the middle person is.

*Marks:* 1 mark for finding 30 and the 15th/16th (or 15.5th) value. 1 mark for the correct class.

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**6** (3 marks)

40 students each chose their favourite fruit.

The table shows some information about their choices.

Twice as many students chose banana as chose pear.

Complete the table.

$$\text{Apple and orange: } 11 + 8 = 19$$

$$\text{Banana and pear together: } 40 - 19 = 21$$

Banana is twice pear, so think of it as 2 parts banana and 1 part pear.

$$\text{That is 3 parts, so 1 part} = 21 \div 3 = 7$$

$$\text{Pear} = 7$$

$$\text{Banana} = 2 \times 7 = 14$$

| Fruit  | Frequency |
|--------|-----------|
| Apple  | 11        |
| Orange | 8         |
| Banana | 14        |
| Pear   | 7         |

**Answer:** Banana 14, Pear 7

Marks: 1 mark for  $40 - 19 = 21$ . 1 mark for  $21 \div 3$ . 1 mark for both correct.

**7** (4 marks)

The table shows the number of goals scored in each of 30 football matches.

| Goals     | 0 | 1 | 2 | 3 | 4 |
|-----------|---|---|---|---|---|
| Frequency | 4 | 9 |   | 5 | 3 |

- (a) Work out the number of matches with 2 goals.

There were 30 matches in total.

Add the known frequencies:  $4 + 9 + 5 + 3 = 21$

Matches with 2 goals:  $30 - 21 = 9$

**Answer:** 9

Marks: 1 mark for  $30 - 21$ . 1 mark for 9.

- (b) Work out the total number of goals scored.

For each row, multiply the number of goals by the frequency.

$$0 \times 4 = 0$$

$$1 \times 9 = 9$$

$$2 \times 9 = 18$$

$$3 \times 5 = 15$$

$$4 \times 3 = 12$$

$$\text{Add them: } 0 + 9 + 18 + 15 + 12 = 54$$

**Answer:** 54

**Tip:** Adding the frequencies gives the number of matches (30), not the number of goals. Multiply first, then add.

*Marks:* 1 mark for multiplying goals by frequency. 1 mark for 54 (follow-through from your answer to part (a)).

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