

Frequency Trees

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 (4 marks)

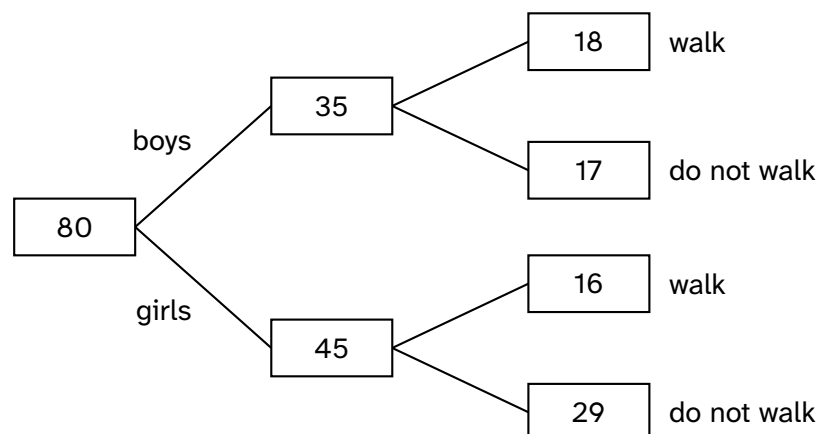
80 students were asked if they walk to school.

(a) Complete the frequency tree.

$$\text{Girls: } 80 - 35 = 45$$

$$\text{Boys who do not walk: } 35 - 18 = 17$$

$$\text{Girls who walk: } 45 - 29 = 16$$



Answer: 45, 17, 16

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

(b) One of the students is picked at random.

Work out the probability that the student walks to school.

$$\text{Students who walk: boys } 18 + \text{girls } 16 = 34$$

There are 80 students altogether.

$$P(\text{walks}) = \frac{34}{80}$$

Answer: $\frac{34}{80}$

Marks: 1 mark for 34. 1 mark for $\frac{34}{80}$ or an equivalent.

2 (4 marks)

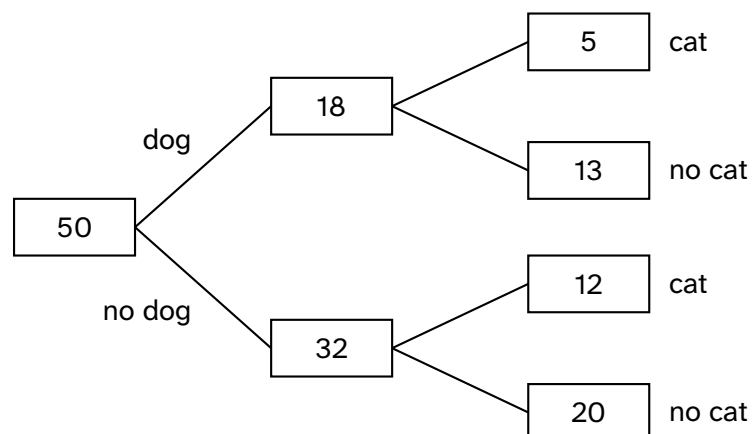
50 people were asked if they have a dog and if they have a cat.

(a) Complete the frequency tree.

The two branches from each box must add up to the number in that box.

Dog, no cat: $18 - 5 = 13$

No dog, cat: $32 - 20 = 12$



Answer: 13 and 12

Marks: 1 mark for 13. 1 mark for 12.

(b) How many of the people have a cat?

Add both "cat" boxes: $5 + 12 = 17$

Answer: 17

- (c) One of the people is picked at random.

Write down the probability that they have a dog **and** a cat.

Dog **and** cat is the box at the end of the dog, cat branch: 5 people.

There are 50 people altogether.

Answer: $\frac{5}{50}$

3 (4 marks)

120 people are at a cinema.

70 of the people are adults.

$\frac{4}{7}$ of the adults watch film B. The others watch film A.

30 of the children watch film B. The others watch film A.

- (a) Use this information to complete the frequency tree.

Adults: 70. Children: $120 - 70 = 50$

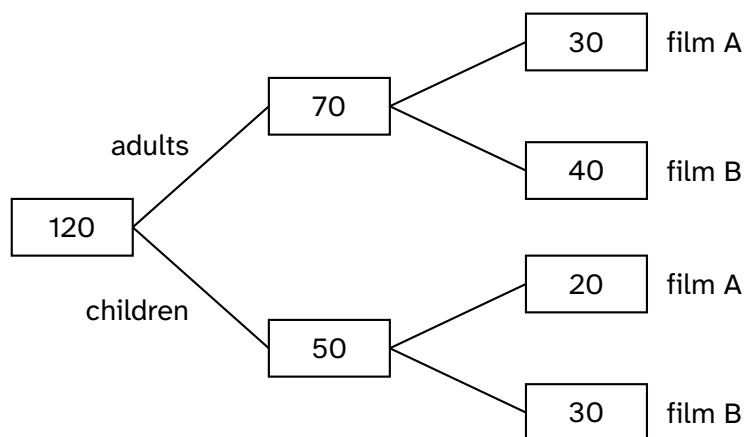
Adults, film B: $\frac{4}{7}$ of 70

$70 \div 7 = 10$, and $10 \times 4 = 40$

Adults, film A: $70 - 40 = 30$

Children, film B: 30

Children, film A: $50 - 30 = 20$



Answer: See tree

Tip: To find $\frac{4}{7}$ of 70, divide by 7 and then multiply by 4. Do not just write 4 and 7 on the branches.

Marks: 3 marks for a fully correct tree. 2 marks for 5 or 6 correct numbers. 1 mark for 3 or 4 correct.

(b) What fraction of the people who watched film A were children?

People who watched film A: $30 + 20 = 50$

20 of them were children.

Answer: $\frac{20}{50}$

Tip: The question is only about people who watched film A, so the bottom of the fraction is 50, not 120.

4 (5 marks)

A farm shop sold 300 boxes of eggs in one week.

Each box was free-range or barn, and held 6 eggs or 12 eggs.

60% of the boxes were free-range.

$\frac{2}{3}$ of the free-range boxes held 6 eggs.

45 of the barn boxes held 12 eggs.

Complete the frequency tree.

Start with 300 boxes.

Free-range: 60% of $300 = 0.6 \times 300 = 180$

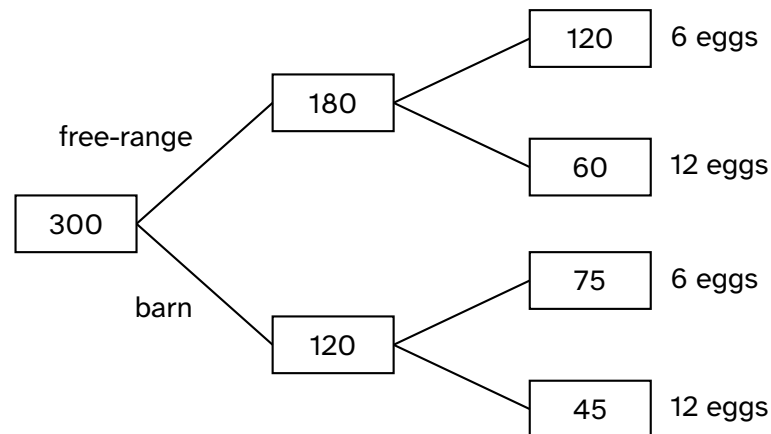
Barn: $300 - 180 = 120$

Free-range, 6 eggs: $\frac{2}{3}$ of $180 = 180 \div 3 \times 2 = 120$

Free-range, 12 eggs: $180 - 120 = 60$

Barn, 12 eggs: 45 (given).

Barn, 6 eggs: $120 - 45 = 75$



Answer: 300; 180, 120; 120, 60; 75, 45

Tip: The $\frac{2}{3}$ is a fraction of the free-range boxes (180), not of all 300 boxes.

Marks: 1 mark for 300 and 180. 1 mark for 120 barn boxes. 1 mark for 120 free-range 6-egg boxes. 1 mark for 60. 1 mark for 75 and 45.

5 (6 marks)

400 people visited a leisure centre one day.

35% of the people used the pool.

$\frac{3}{4}$ of the people who did not use the pool used the gym.

(a) Complete the frequency tree.

Pool: 35% of 400

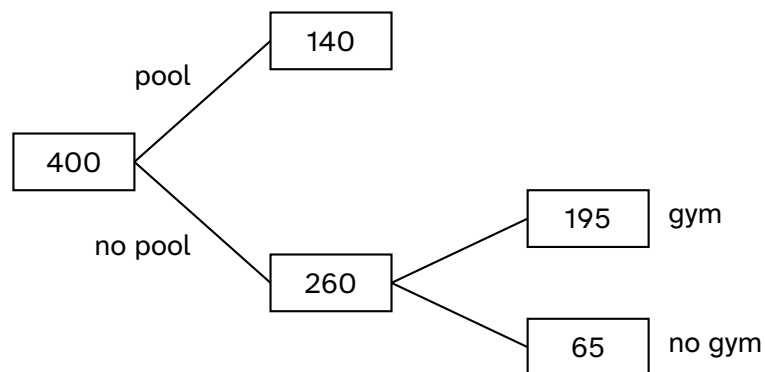
10% of 400 = 40, so 30% = 120 and 5% = 20

35% = 120 + 20 = 140

No pool: $400 - 140 = 260$

Gym: $\frac{3}{4}$ of 260 = $260 \div 4 \times 3 = 195$

No gym: $260 - 195 = 65$



Answer: 140, 260; 195, 65

Tip: The $\frac{3}{4}$ is of the people who did **not** use the pool (260), not of all 400 people.

Marks: 1 mark for 140. 1 mark for 260. 1 mark for $\frac{3}{4} \times 260$. 1 mark for 195 and 65.

- (b) What fraction of the 400 people used neither the pool nor the gym?
Give your answer in its simplest form.

People who used neither: the “no pool, no gym” box, 65.

Fraction = $\frac{65}{400}$

Divide top and bottom by 5: $\frac{65}{400} = \frac{13}{80}$

Answer: $\frac{13}{80}$

Marks: 1 mark for $\frac{65}{400}$. 1 mark for $\frac{13}{80}$.

6 (4 marks)

There are 150 visitors at a campsite.

Each visitor is staying in a tent or in a caravan.

The ratio of visitors in tents to visitors in caravans is 3:2

72 of the visitors are staying for more than one night.

$\frac{1}{3}$ of the visitors in caravans are staying for one night.

Complete the frequency tree.

Share 150 in the ratio 3:2. Total parts: $3 + 2 = 5$

One part: $150 \div 5 = 30$

Tent: $3 \times 30 = 90$

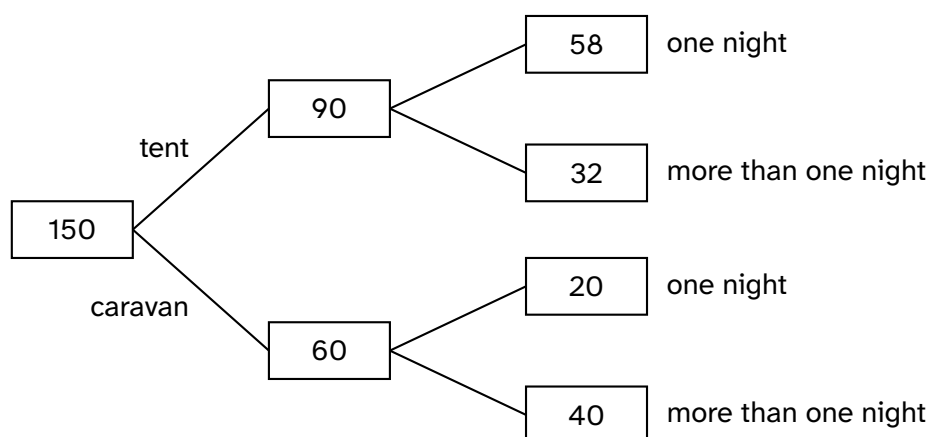
Caravan: $2 \times 30 = 60$

Caravan, one night: $\frac{1}{3}$ of $60 = 20$

Caravan, more than one night: $60 - 20 = 40$

Tent, more than one night: $72 - 40 = 32$

Tent, one night: $90 - 32 = 58$



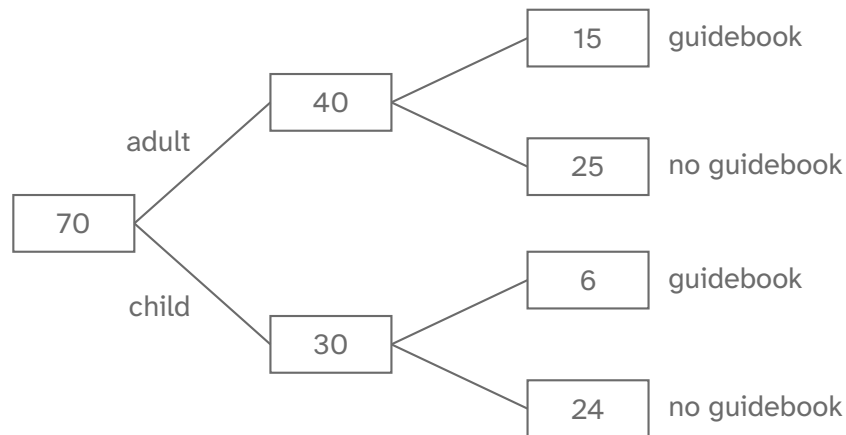
Answer: 90, 60; 58, 32; 20, 40

Tip: The 72 visitors staying more than one night are in tents **and** caravans. Take away the caravan visitors to find the tent visitors.

Marks: 1 mark for 90 and 60. 1 mark for 20 and 40. 1 mark for 32. 1 mark for 58.

7 (4 marks)

A museum sells adult tickets at £12 each and child tickets at £7 each. Visitors can also buy a guidebook. Every guidebook is the same price. The frequency tree shows the tickets and guidebooks sold one morning.



The museum took £774 in total for tickets and guidebooks that morning. Work out the price of one guidebook.

Adult tickets: $40 \times £12 = £480$

Child tickets: $30 \times £7 = £210$

Tickets altogether: $£480 + £210 = £690$

Money from guidebooks: $£774 - £690 = £84$

Guidebooks sold: $15 + 6 = 21$

Price of one guidebook: $£84 \div 21 = £4$

Answer: £4

Tip: Both adults and children can buy a guidebook. Add the two “guidebook” boxes to find how many were sold.

Marks: 1 mark for 40×12 or 30×7 . 1 mark for $774 - 690$ (or 84). 1 mark for $15 + 6 = 21$ guidebooks. 1 mark for £4.