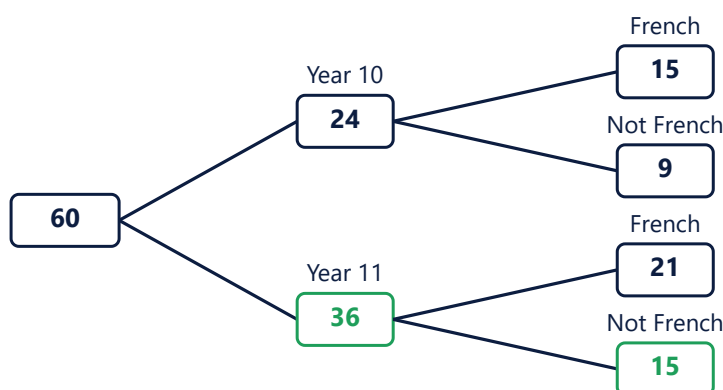




- 1 There are 60 students in Year 10 and Year 11 at a small school.
24 of the students are in Year 10 and the rest are in Year 11.
Of the Year 10 students, 15 study French and 9 do not.
Of the Year 11 students, 21 study French.
a. Work out the number of students in Year 11.
b. Work out the number of Year 11 students who do not study French.



(3 marks)

A frequency tree counts people, rather than showing probabilities. The two branches leaving each group must add to the number in that group

$$\text{Number in Year 11} = 60 - 24 = 36$$

$$\text{Year 11 students not studying French} = 36 - 21 = 15$$

Check

$$15 + 9 = 24 \text{ and } 21 + 15 = 36, \text{ so every branch adds up correctly}$$

2

80 adults went to a gym on Saturday.

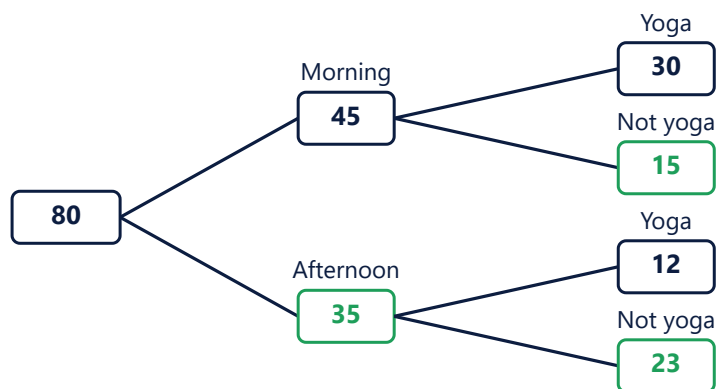
45 of the adults went to a morning class. The rest went to an afternoon class.

Of the adults at the morning class, 30 did yoga.

Of the adults at the afternoon class, 12 did yoga.

a. Complete the frequency tree.

b. One of the 80 adults is chosen at random. Find the probability that this adult went to the morning class and did yoga.



(4 marks)

$$\text{Afternoon class} = 80 - 45 = 35$$

$$\text{Morning, not yoga} = 45 - 30 = 15$$

$$\text{Afternoon, not yoga} = 35 - 12 = 23$$

$$P(\text{morning and yoga}) = \frac{30}{80} = \frac{3}{8}$$

3

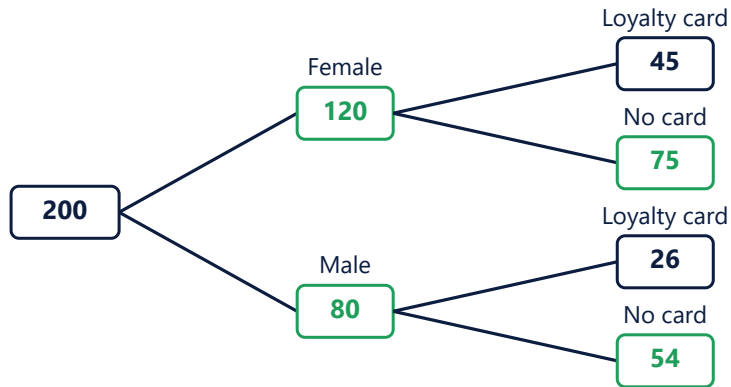
200 shoppers visited a supermarket one morning.

60% of the shoppers were female. The rest were male.

45 of the female shoppers used a loyalty card.

26 of the male shoppers used a loyalty card.

- Work out the number of female shoppers and the number of male shoppers.
- Work out the number of female shoppers who did not use a loyalty card.
- Work out the number of male shoppers who did not use a loyalty card.



(4 marks)

Female shoppers = 60% of 200 = $0.6 \times 200 = 120$, so male shoppers = $200 - 120 = 80$

Female with no loyalty card = $120 - 45 = 75$

Male with no loyalty card = $80 - 26 = 54$

4

150 patients had an appointment at a health centre one day.

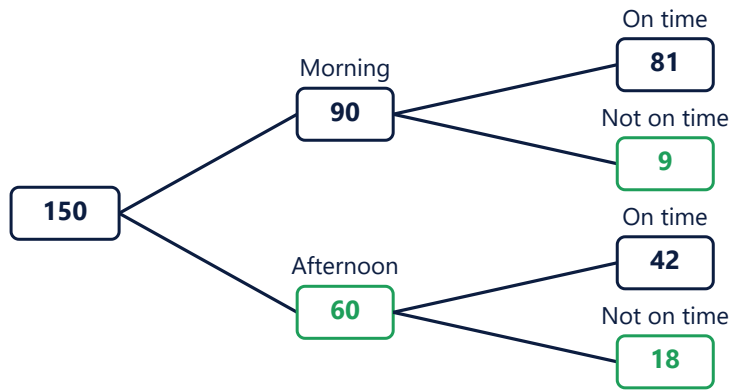
90 of the appointments were in the morning. The rest were in the afternoon.

81 of the morning appointments started on time.

42 of the afternoon appointments started on time.

a. Complete the frequency tree.

b. One of the 150 patients is chosen at random. Work out the probability that their appointment started on time.



(4 marks)

$$\text{Afternoon appointments} = 150 - 90 = 60$$

$$\text{Morning not on time} = 90 - 81 = 9; \text{afternoon not on time} = 60 - 42 = 18$$

$$\text{Appointments on time altogether} = 81 + 42 = 123$$

$$P(\text{on time}) = \frac{123}{150} = \frac{41}{50} = 0.82$$

5

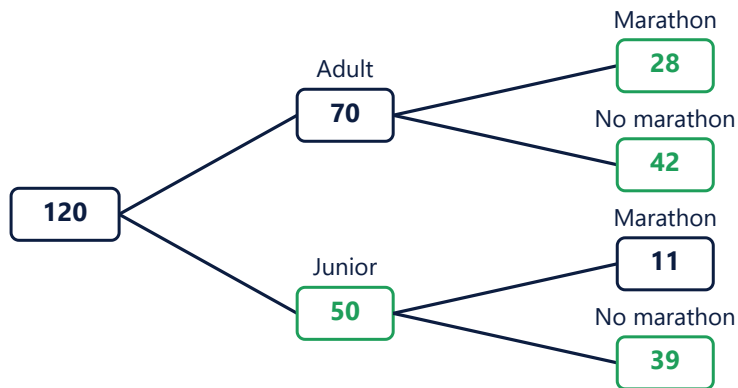
A running club has 120 members. Each member is an adult or a junior.

70 of the members are adults. The rest are juniors.

$\frac{2}{5}$ of the adults ran a marathon last year.

11 of the juniors ran a marathon last year.

- Work out the number of juniors in the club.
- Work out the number of adults who ran a marathon last year.
- One of the members who ran a marathon last year is chosen at random. Work out the probability that this member is a junior.



(5 marks)

$$\text{Juniors} = 120 - 70 = 50$$

$$\text{Adults who ran a marathon} = \frac{2}{5} \text{ of } 70 = 28$$

$$\text{Total members who ran a marathon} = 28 + 11 = 39$$

$$P(\text{junior}) = \frac{11}{39}$$

6

80 students were asked how they travel to school. The table shows the results.

	Cycle	Do not cycle
Boys	18	27
Girls	14	21

A frequency tree is drawn. The first branches show boys and girls. The second branches show cycle and do not cycle.

- Write down the numbers that go on the two first branches and on the four second branches.
- One of the students who cycle is chosen at random. Work out the probability that this student is a girl.

(4 marks)

a)

$$\text{boys} = 18 + 27 = 45$$

$$\text{girls} = 14 + 21 = 35$$

second branches: 18, 27, 14, 21

b)

$$\text{students who cycle} = 18 + 14 = 32$$

$$\begin{aligned} P(\text{girl}) &= \frac{14}{32} \\ &= \frac{7}{16} \end{aligned}$$

a) see above b) $\frac{7}{16}$

7

A gardener planted 240 seeds.

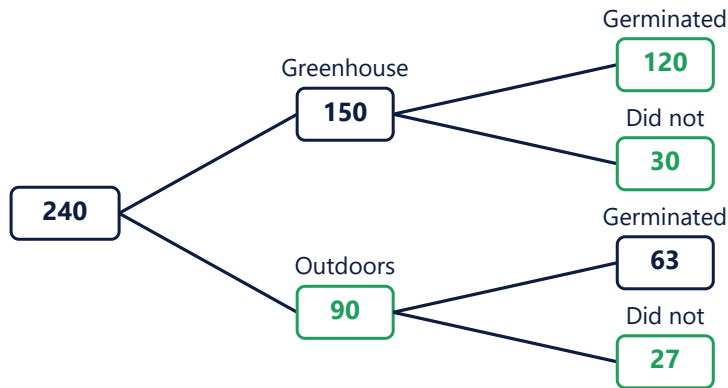
150 of the seeds were planted in a greenhouse. The rest were planted outdoors.

80% of the greenhouse seeds germinated.

63 of the outdoor seeds germinated.

a. Complete the frequency tree.

b. What percentage of the outdoor seeds germinated?



(5 marks)

$$\text{Outdoor seeds} = 240 - 150 = 90$$

Greenhouse seeds that germinated = 80% of 150 = 120, so 150 - 120 = 30 did not

$$\text{Outdoor seeds that did not germinate} = 90 - 63 = 27$$

$$\text{Percentage of outdoor seeds that germinated} = \frac{63}{90} \times 100 = 70\%$$

8

300 passengers took a flight.

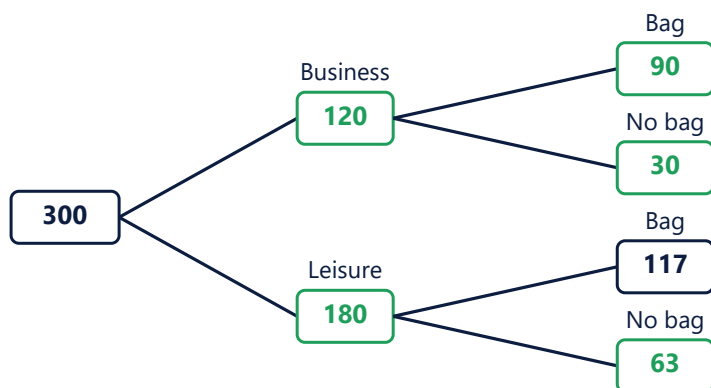
40% of the passengers were travelling for business. The rest were travelling for leisure.

$\frac{3}{4}$ of the business passengers checked in a bag.

117 of the leisure passengers checked in a bag.

a. Complete the frequency tree.

b. One of the 300 passengers is chosen at random. Work out the probability that this passenger was travelling for leisure and did not check in a bag.



(5 marks)

Business passengers = 40% of 300 = 120, so Leisure passengers = 300 - 120 = 180

Business passengers with a bag = $\frac{3}{4}$ of 120 = 90, so 120 - 90 = 30 had no bag

Leisure passengers with no bag = 180 - 117 = 63

$P(\text{leisure and no bag}) = \frac{63}{300} = \frac{21}{100} = 0.21$

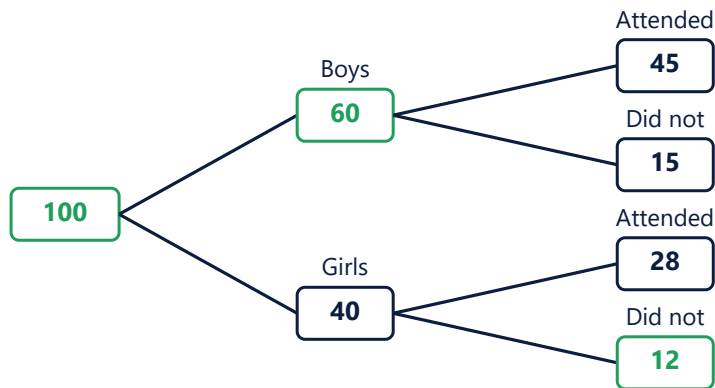
9

Every student at a sports academy is a boy or a girl.

45 of the boys attended training on Monday and 15 of the boys did not.

There are 40 girls. 28 of the girls attended training on Monday.

- Work out the total number of students at the academy.
- One student is chosen at random. Work out the probability that this student attended training on Monday.



(5 marks)

$$\text{Number of boys} = 45 + 15 = 60$$

$$\text{Total students} = 60 + 40 = 100$$

$$\text{Students who attended training} = 45 + 28 = 73$$

$$P(\text{attended}) = \frac{73}{100}$$

10

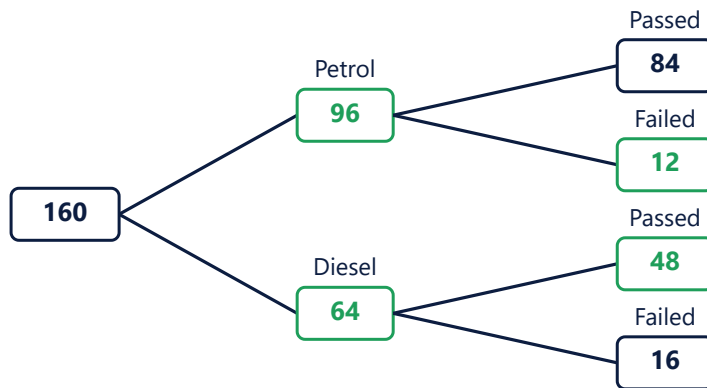
160 cars were given a safety test at a garage.

$\frac{3}{5}$ of the cars were petrol cars. The rest were diesel cars.

84 of the petrol cars passed the test. The rest of the petrol cars failed.

16 of the diesel cars failed the test. The rest of the diesel cars passed.

- Work out the number of diesel cars tested.
- Work out the number of petrol cars that failed the test.
- What percentage of the 160 cars failed the test?



(5 marks)

$$\text{Petrol cars} = \frac{3}{5} \text{ of } 160 = 96, \text{ so diesel cars} = 160 - 96 = 64$$

$$\text{Petrol cars that failed} = 96 - 84 = 12$$

$$\text{Total failures} = 12 + 16 = 28$$

$$\text{Percentage failed} = \frac{28}{160} \times 100 = 17.5\%$$

11

180 people were in the audience at a theatre show.

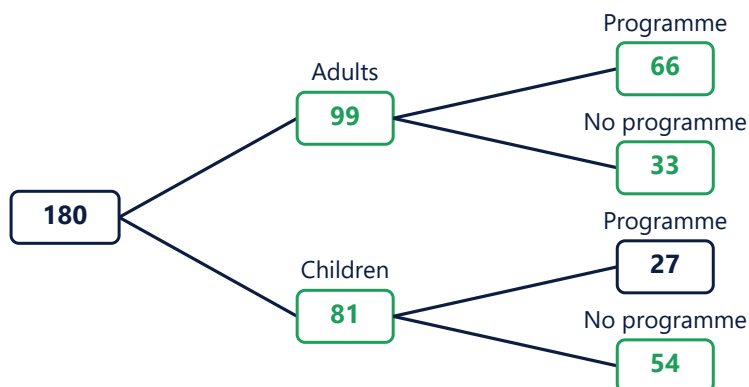
55% of the audience were adults. The rest were children.

$\frac{2}{3}$ of the adults bought a programme.

27 of the children bought a programme.

Programmes cost £4 each.

- Work out the number of adults and the number of children in the audience.
- Work out the number of adults who bought a programme.
- Work out the total amount of money the theatre received from programme sales.



(5 marks)

$$\text{Adults} = 55\% \text{ of } 180 = 0.55 \times 180 = 99, \text{ so children} = 180 - 99 = 81$$

$$\text{Adults who bought a programme} = \frac{2}{3} \text{ of } 99 = 66$$

$$\text{Total programmes sold} = 66 + 27 = 93$$

$$\text{Money received} = 93 \times £4 = £372$$