

# Probability review *[68 marks]*

All the children in a summer camp play at least one sport, from a choice of football ( $F$ ) or basketball ( $B$ ). 15 children play both sports.

The number of children who play only football is double the number of children who play only basketball.

Let  $x$  be the number of children who play only football.

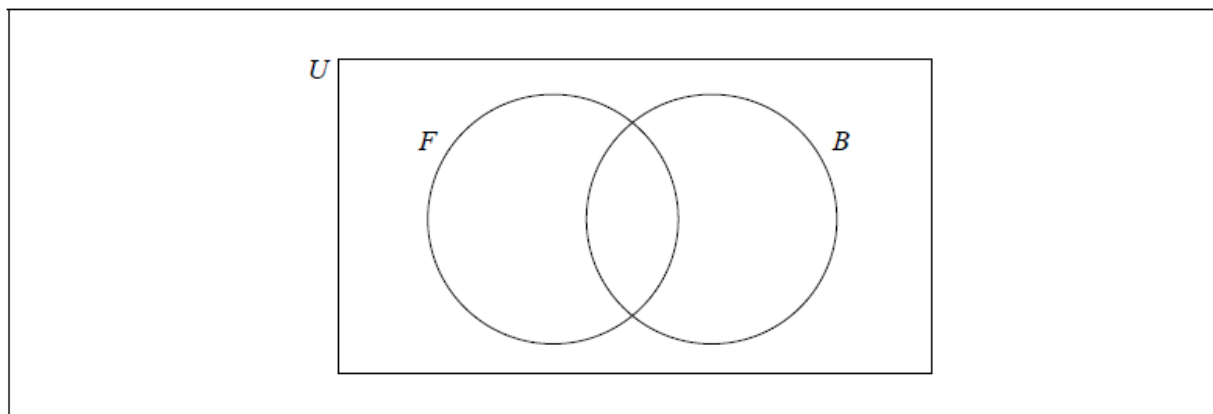
- 1a. Write down an expression, in terms of  $x$ , for the number of children who play only basketball. *[1 mark]*

.....

.....

.....

- 1b. Complete the Venn diagram using the above information. *[2 marks]*



There are 120 children in the summer camp.

1c. Find the number of children who play only football.

[2 marks]

.....

.....

.....

1d. Write down the value of  $n(F)$ .

[1 mark]

.....

.....

.....

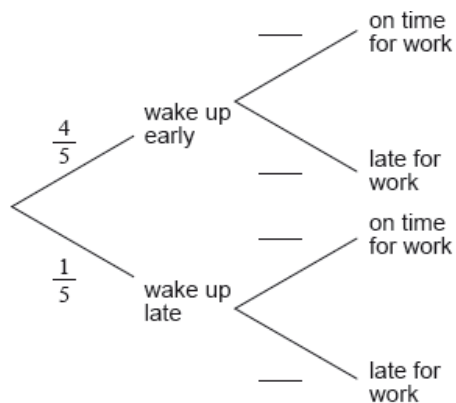
On a work day, the probability that Mr Van Winkel wakes up early is  $\frac{4}{5}$ .

If he wakes up early, the probability that he is on time for work is  $p$ .

If he wakes up late, the probability that he is on time for work is  $\frac{1}{4}$ .

2a. Complete the tree diagram below.

[2 marks]



The probability that Mr Van Winkel arrives on time for work is  $\frac{3}{5}$ .

2b. Find the value of  $p$ .

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

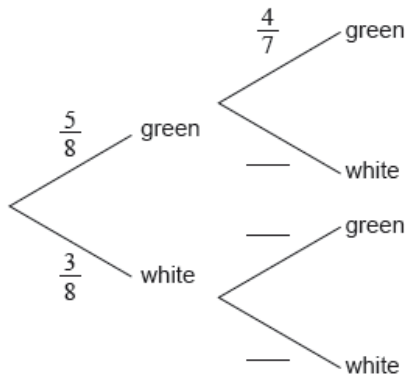
.....

.....

A bag contains 5 green balls and 3 white balls. Two balls are selected at random without replacement.

3a. Complete the following tree diagram.

[3 marks]



3b. Find the probability that exactly one of the selected balls is green. [3 marks]

.....

.....

.....

.....

.....

.....

.....

.....

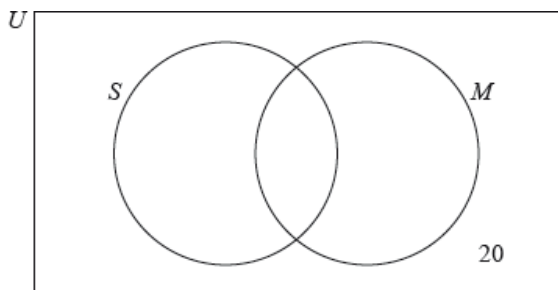
.....

Rosewood College has 120 students. The students can join the sports club ( $S$ ) and the music club ( $M$ ).

For a student chosen at random from these 120, the probability that they joined both clubs is  $\frac{1}{4}$  and the probability that they joined the music club is  $\frac{1}{3}$ .

There are 20 students that did not join either club.

4a. Complete the Venn diagram for these students. [2 marks]



4b. One of the students who joined the sports club is chosen at random. Find [2 marks] the probability that this student joined both clubs.

.....

.....

.....

.....

.....

.....

4c. Determine whether the events  $S$  and  $M$  are independent. [2 marks]

.....

.....

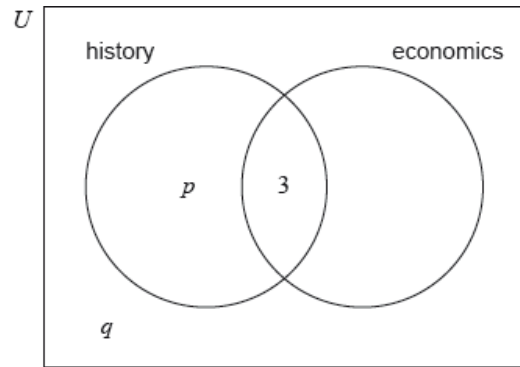
.....

.....

.....

.....

In a group of 20 girls, 13 take history and 8 take economics. Three girls take both history and economics, as shown in the following Venn diagram. The values  $p$  and  $q$  represent numbers of girls.



5a. Find the value of  $p$ ;

[2 marks]

.....

.....

.....

5b. Find the value of  $q$ .

[2 marks]

.....

.....

.....

5c. A girl is selected at random. Find the probability that she takes economics but not history.

[2 marks]

.....

.....

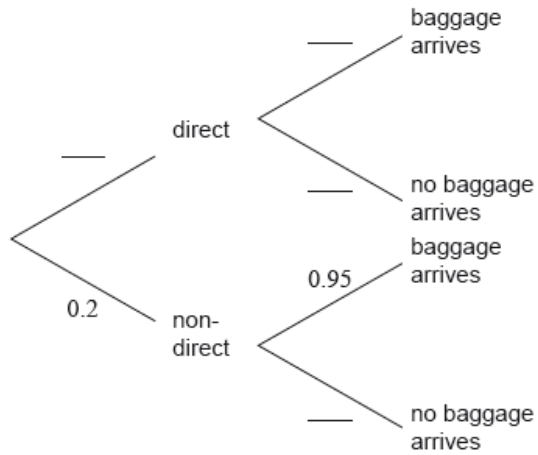
.....

Sara regularly flies from Geneva to London. She takes either a direct flight or a non-directflight that goes via Amsterdam.

If she takes a direct flight, the probability that her baggage does not arrive in London is 0.01.

If she takes a non-direct flight the probability that her baggage arrives in London is 0.95.

The probability that she takes a non-direct flight is 0.2.



6a. Complete the tree diagram.

[3 marks]

6b. Find the probability that Sara's baggage arrives in London.

[3 marks]

.....
.....
.....
.....
.....
.....

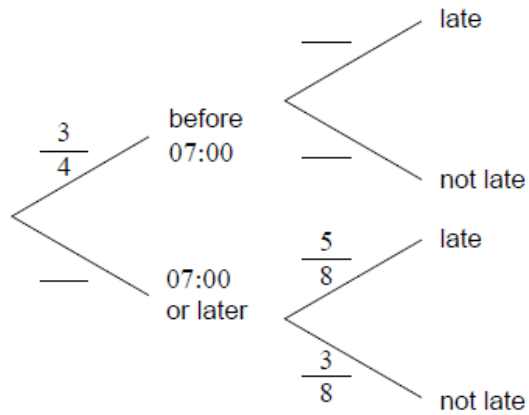
Pablo drives to work. The probability that he leaves home before 07:00 is  $\frac{3}{4}$ .

If he leaves home before 07:00 the probability he will be late for work is  $\frac{1}{8}$ .

If he leaves home at 07:00 or later the probability he will be late for work is  $\frac{5}{8}$ .

7a. **Copy** and complete the following tree diagram.

[3 marks]



.....

.....

.....

.....

.....

.....



7b. Find the probability that Pablo leaves home before 07:00 and is late for work. [2 marks]

.....

.....

.....

7c. Find the probability that Pablo is late for work. [3 marks]

.....

.....

.....

.....

.....

.....

7d. Given that Pablo is late for work, find the probability that he left home before 07:00. [3 marks]

.....

.....

.....

.....

.....

.....

7e. Two days next week Pablo will drive to work. Find the probability that he will be late at least once. [3 marks]

.....

.....

.....

.....

.....

.....

Andre will play in the semi-final of a tennis tournament.

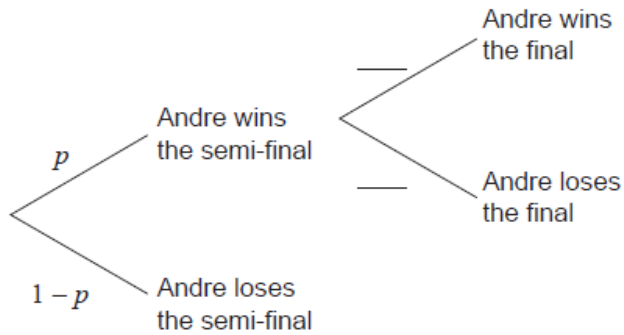
If Andre wins the semi-final he will progress to the final. If Andre loses the semi-final, he will **not** progress to the final.

If Andre wins the final, he will be the champion.

The probability that Andre will win the semi-final is  $p$ . If Andre wins the semi-final, then the probability he will be the champion is 0.6.

8a. Complete the values in the tree diagram.

[1 mark]



The probability that Andre will not be the champion is 0.58.

8b. Find the value of  $p$ .

[2 marks]

.....
.....
.....
.....
.....
.....

8c. Given that Andre did not become the champion, find the probability that [3 marks] he lost in the semi-final.

.....

.....

.....

.....

.....

.....

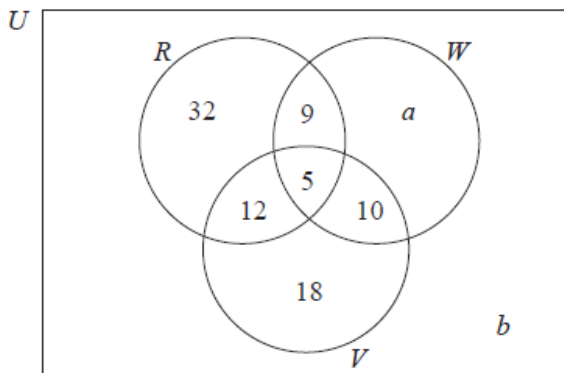
.....

.....

.....

On a school excursion, 100 students visited an amusement park. The amusement park's main attractions are rollercoasters ( $R$ ), water slides ( $W$ ), and virtual reality rides ( $V$ ).

The students were asked which main attractions they visited. The results are shown in the Venn diagram.



A total of 74 students visited the rollercoasters or the water slides.

9a. Find the value of  $a$ .

[2 marks]

.....

.....

.....

.....

.....

.....

9b. Find the value of  $b$ .

[2 marks]

.....

.....

.....

.....

.....

.....

9c. Find the number of students who visited at least two types of main attraction. [2 marks]

.....

.....

.....

.....

.....

.....

9d. Write down the value of  $n(R \cap W)$ . [1 mark]

.....

.....

.....

9e. Find the probability that a randomly selected student visited the rollercoasters. [2 marks]

.....

.....

.....

.....

.....

.....

9f. Find the probability that a randomly selected student visited the virtual reality rides. [1 mark]

.....

.....

.....

9g. Hence determine whether the events in **parts (d)(i)** and **(d)(ii)** are independent. Justify your reasoning. [2 marks]

.....

.....

.....

.....

.....

.....