

- 1 It is known that 8% of the population of a large city use a particular web browser. A researcher wishes to interview some people from the city who use this browser. He selects people at random, one at a time.
- (i) Find the probability that the first person that he finds who uses this browser is
- (A) the third person selected, [3]
- (B) the second or third person selected. [2]
- (ii) Find the probability that at least one of the first 20 people selected uses this browser. [3]

- 2 Jimmy and Alan are playing a tennis match against each other. The winner of the match is the first player to win three sets. Jimmy won the first set and Alan won the second set. For each of the remaining sets, the probability that Jimmy wins a set is
- 0.7 if he won the previous set,
 - 0.4 if Alan won the previous set.

It is not possible to draw a set.

- (i) Draw a probability tree diagram to illustrate the possible outcomes for each of the remaining sets. [3]
- (ii) Find the probability that Alan wins the match. [3]
- (iii) Find the probability that the match ends after exactly four sets have been played. [2]

- 3 In a food survey, a large number of people are asked whether they like tomato soup, mushroom soup, both or neither. One of these people is selected at random.
- T is the event that this person likes tomato soup.
 - M is the event that this person likes mushroom soup.

You are given that $P(T) = 0.55$, $P(M) = 0.33$ and $P(T | M) = 0.80$.

- (i) Use this information to show that the events T and M are not independent. [1]
- (ii) Find $P(T \cap M)$. [2]
- (iii) Draw a Venn diagram showing the events T and M , and fill in the probability corresponding to each of the four regions of your diagram. [3]

- 4 25% of the plants of a particular species have red flowers. A random sample of 6 plants is selected.
- (i) Find the probability that there are no plants with red flowers in the sample. [2]
- (ii) If 50 random samples of 6 plants are selected, find the expected number of samples in which there are no plants with red flowers. [2]

- 5 In a recent survey, a large number of working people were asked whether they worked full-time or part-time, with part-time being defined as less than 25 hours per week. One of the respondents is selected at random.
- W is the event that this person works part-time.
 - F is the event that this person is female.

You are given that $P(W) = 0.14$, $P(F) = 0.41$ and $P(W \cap F) = 0.11$.

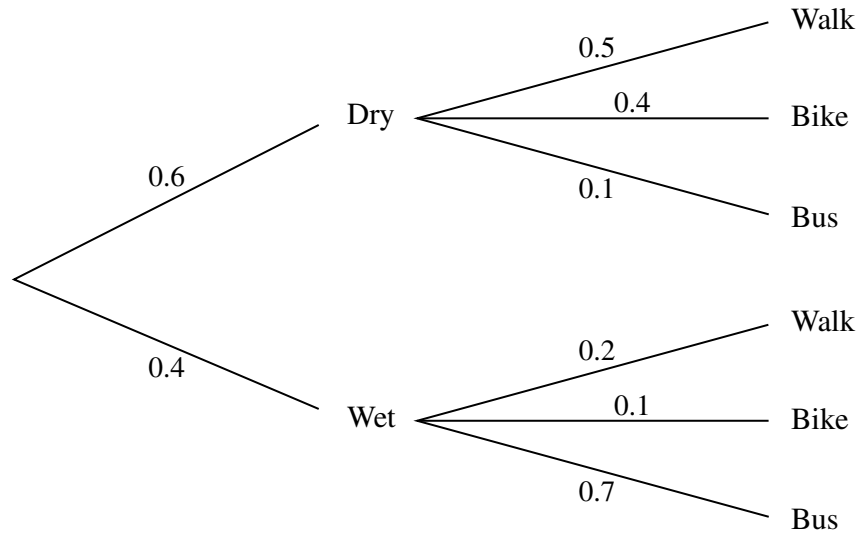
- (i) Draw a Venn diagram showing the events W and F , and fill in the probability corresponding to each of the four regions of your diagram. [3]
- (ii) Determine whether the events W and F are independent. [2]
- (iii) Find $P(W | F)$ and explain what this probability represents. [3]

- 6 The table shows all the possible products of the scores on two fair four-sided dice.

		Score on second die			
		1	2	3	4
Score on first die	1	1	2	3	4
	2	2	4	6	8
	3	3	6	9	12
	4	4	8	12	16

- (i) Find the probability that the product of the two scores is less than 10. [1]
- (ii) Show that the events ‘the score on the first die is even’ and ‘the product of the scores on the two dice is less than 10’ are not independent. [3]

- 7 Andy can walk to work, travel by bike or travel by bus. The tree diagram shows the probabilities of any day being dry or wet and the corresponding probabilities for each of Andy's methods of travel.



A day is selected at random. Find the probability that

- (i) the weather is wet and Andy travels by bus, [2]
- (ii) Andy walks or travels by bike, [3]
- (iii) the weather is dry given that Andy walks or travels by bike. [3]