

## **Probability (Replaced)**

Q1. A bag contains three black balls and seven red balls. A ball is taken out and replaced. This is repeated twice. What is the probability of each of these outcomes?

- a** all three are black
- b** exactly two are black
- c** exactly one is black
- d** none are black

Q2. A dice is thrown four times. What is the probability of each of these?

- a** four sixes are thrown
- b** no sixes are thrown
- c** exactly one six is thrown

Q3. On my way to work I pass three sets of traffic lights. The probability that the first is green is  $\frac{1}{2}$ . The probability that the second is green is  $\frac{1}{3}$ . The probability that the third is green is  $\frac{2}{3}$ . What is the probability of each of these?

- a** all three are green
- b** exactly two are green
- c** exactly one is green
- d** none are green
- e** at least one is green

Q4. Alf is late for school with a probability of 0.9. Bert is late with a probability of 0.7. Chas is late with a probability of 0.6. On any particular day what is the probability of each of these?

- a** exactly one of them being late
- b** exactly two of them being late

Q5. Daisy takes four A-levels. The probability that she will pass English is 0.7. The probability that she will pass history is 0.6. The probability she will pass geography is 0.8. The probability that she will pass general studies is 0.9. What is the probability of each of these?

- a** she passes all four subjects
- b** she passes exactly three subjects
- c** she passes at least three subjects



Q6. The driving test is in two parts, a written test and a practical test. It is known that 90% of people who take the written test pass, and 60% of people who take the practical test pass. A person who passes the written test does not have to take it again. A person who fails the practical test does have to take it again.

- a What is the probability that someone passes the written test?
- b What is the probability that someone passes the practical test?
- c What is the probability that someone passes both tests?
- d What is the probability that someone passes the written test but takes two attempts to pass the practical test?

Q7. Six out of ten cars in Britain are made by foreign manufacturers. Three cars can be seen approaching in the distance.

- a What is the probability that the first one is foreign?
- b The first car is going so fast that its make could not be made out. What is the probability that the second car is foreign?
- c What is the probability that exactly two of the three cars are foreign?
- d Explain why, if the first car is foreign, the probability of the second car being foreign is still 6 out of 10. Each day Mr Smith runs home. He has a choice of three routes: the road, the fields or the canal path. The road route is 4 miles, the fields route is 6 miles and the canal route is 5 miles. In a three-day period, what is the probability that Mr Smith runs a total distance of
  - a exactly 17 miles
  - b exactly 13 miles
  - c exactly 15 miles
  - d over 17 miles?

Q8. A rock climber attempts a difficult route. There are three hard moves at points A, B and C in the climb. The climber has a probability of 0.6, 0.3 and 0.7 respectively of completing each of these moves. What is the probability that the climber

- a completes the climb
- b fails at move A
- c fails at move B
- d fails at move C



### ***Probability ( Without replaced)***

Q1. A box contains 10 Black and 15 White balls. One is taken out and not replaced. Another is taken out.

**a** If the first ball taken out is Black, what is the probability that the second ball is

**i** Black? **ii** White?

**b** If the first ball taken out is White, what is the probability that the second ball is  
**i** Black? **ii** White?

Q2. A fruit bowl contains six Granny Smith apples and eight Golden Delicious apples. Kevin takes two apples at random.

**a** If the first apple is a Granny Smith, what is the probability that the second is  
**i** a Granny Smith? **ii** a Golden Delicious?

**b** What is the probability that  
**i** both are Granny Smiths? **ii** both are Golden Delicious?

Q3. Ann has a bargain box of tins. They are unlabelled but she knows that six tins contain soup and four contain peaches.

**a** She opens two tins. What is the probability that  
**i** they are both soup? **ii** they are both peaches?

**b** What is the probability that she has to open two tins before she gets a tin of peaches?

**c** What is the probability that she has to open three tins before she gets a tin of peaches?

**d** What is the probability that she will get a tin of soup if she opens five tins?

Q4. One in three cars on British roads is made in Britain. A car comes down the road. It is a British-made car. John says that the probability of the next car being British made is one in two because a British-made car has just gone past. Explain why he is wrong.

Q5. A bag contains three black balls and seven red balls. A ball is taken out and not replaced. This is repeated twice. What is the probability of each of these outcomes?

**a** all three are black

**b** exactly two are black

**c** exactly one is black

**d** none are black



Q5. One my way to work, I pass two sets of traffic lights. The probability that the first is green is  $\frac{1}{3}$  . If the first is green, the probability that the second is green is  $\frac{1}{3}$  . If the first is red, the probability that the second is green is  $\frac{2}{3}$  . What is the probability of each of these?

- a** both are green
- b** none are green
- c** exactly one is green
- d** at least one is green

Q6. A hand of five cards is dealt. What is the probability of each of these outcomes?

- a** all five are Spades
- b** all five are the same suit
- c** they are four Aces and any other card
- d** they are four of a kind and any other card

Q7. An engineering test is in two parts, a written test and a practical test. It is known that 90% who take the written test pass. When a person passes the written test, the probability that he/she will also pass the practical test is 60%. When a person fails the written test, the probability that he/she will pass the practical test is 20%.

- a** What is the probability that someone passes both tests?
- b** What is the probability that someone passes one test?
- c** What is the probability that someone fails both tests?
- d** What is the combined probability of the answers to parts **a**, **b** and **c**?

Q8. Each day Mr Smith runs home from work. He has a choice of three routes. The road, the fields or the canal path. On Monday, each route has an equal probability of being chosen. The route chosen on any day will not be picked the next day and so each of the other two routes has an equal probability of being chosen.

**a** Write down all the possible combinations so that Mr Smith runs home via the canal path on Wednesday (there are four of them).

**b** Calculate the probability that Mr Smith runs home via the canal path on Wednesday.

**c** Calculate the probability that Mr Smith runs home via the canal path on Tuesday.

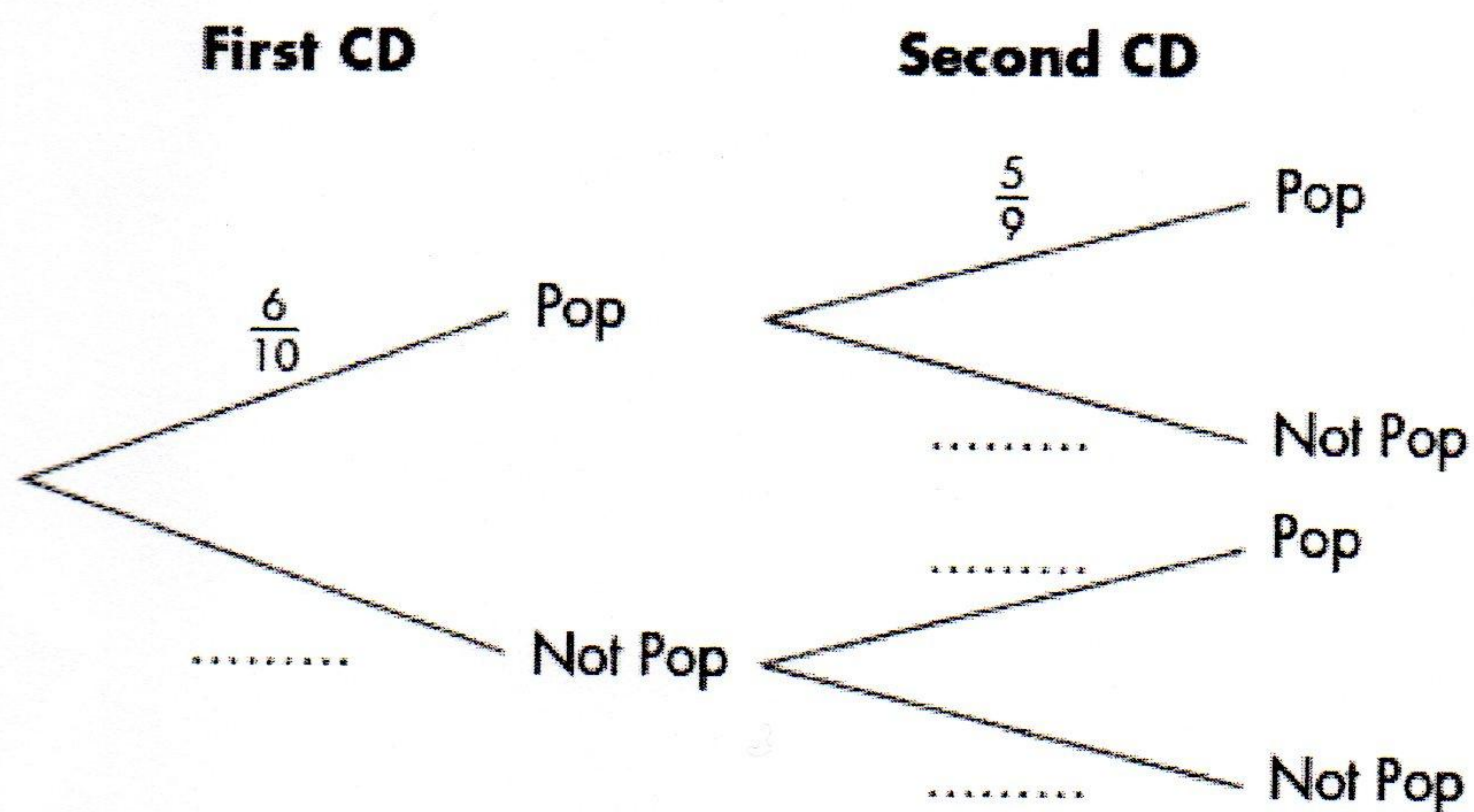
**d** Using your results from parts **b** and **c**, write down the probability that Mr Smith runs home via the canal path on Thursday.



Q9. Arthur has a box of 10 unlabelled CDs. The CDs are pop, classical or dance. The table shows the probability of each type of music if a CD is taken out at random.

Type of music	Probability
Pop	0.6
Classical	0.1
Dance	

- a What is the probability that a CD chosen at random is a dance CD?
- b How many classical CDs are in the box?
- c Arthur picks a CD at random and puts it in a 2-disc CD player. He then picks another CD at random and puts it in the player. Complete the tree diagram



- d What is the probability that neither of the CDs is pop?