

KS3 – Tree Diagrams

Section A – Tree Diagrams

Q1 (5 marks)

A fair coin is tossed twice.

a) Draw a fully labelled tree diagram showing both tosses.

b) Write the probability on every branch.

c) Find $P(HH)$.

d) Find $P(\text{exactly one head})$.

Q2 (6 marks)

A bag contains 3 red counters and 2 blue counters. A counter is chosen at random, replaced, and then a second counter is chosen.

a) Draw a fully labelled tree diagram.

b) Write the probability on every branch.

c) Find $P(\text{red then red})$.

d) Find $P(\text{red then blue})$.

e) Find $P(\text{one of each colour})$.

Q3 (6 marks)

A spinner has probability 0.7 of landing on A and 0.3 of landing on B. It is spun twice.

a) Draw and label a tree diagram.

b) Find $P(AA)$.

c) Find $P(AB)$.

d) Find $P(\text{exactly one B})$.

e) Find $P(\text{at least one A})$.

Q4 (5 marks)

A biased coin has $P(\text{Heads}) = 0.6$. It is tossed twice.

a) Find $P(\text{Tails})$.

b) Draw a probability tree.

c) Find $P(\text{two heads})$.

d) Find $P(\text{two tails})$.

e) Find $P(\text{one head and one tail})$.

Q5 (6 marks)

A bag contains 4 green counters and 6 yellow counters. One counter is chosen and NOT replaced. A second counter is then chosen.

a) Draw a fully labelled tree diagram.

b) Write the probabilities on the first set of branches.

c) If green is chosen first, write the probabilities for the second choice.

d) If yellow is chosen first, write the probabilities for the second choice.

e) Find $P(\text{two green counters})$.

Challenge

Q6 (6 marks)

A game is won if a player gets Heads on a biased coin and then rolls an even number on a fair six-sided die. $P(\text{Heads}) = 0.4$.

a) Draw a tree diagram for the coin result followed by the die result, grouping the die as Even or Odd.

b) Write all branch probabilities.

c) Find the probability of winning.

d) Find the probability of not winning.

e) Explain why the probabilities of winning and not winning add to 1.

Section B – Frequency Trees

Q7 (5 marks)

120 students are asked whether they study French. 70 study French and 50 do not. Of the 70 who study French, 42 are girls.

a) Draw a frequency tree to show this information.

b) How many boys study French?

c) If 31 of the students who do not study French are boys, how many are girls?

d) Complete your frequency tree using this information.

Q8 (6 marks)

200 people are asked whether they exercise at least three times a week. 130 answer Yes and the rest answer No. Of those who answer Yes, 75 are adults. Of those who answer No, 40 are adults.

a) Draw and complete a frequency tree.

b) How many people answer No?

c) How many children answer Yes?

d) How many children answer No?

e) How many children are there altogether?

Q9 (5 marks)

A frequency tree represents 180 cinema customers. 108 bought popcorn and the rest did not. Of the customers who bought popcorn, 63 also bought a drink. Of those who did not buy popcorn, 24 bought a drink.

- a) How many customers did not buy popcorn?

- b) How many bought popcorn but did not buy a drink?

- c) How many bought neither popcorn nor a drink?

- d) How many customers bought a drink altogether?

- e) Use your answers to draw a complete frequency tree.

Q10 (5 marks)

A school club has 150 members. 90 are in KS3 and 60 are in KS4. In KS3, 54 members attend on Wednesday. In KS4, 39 attend on Wednesday.

a) Draw a frequency tree separating KS3/KS4 and then Wednesday/Not Wednesday.

b) How many KS3 members do not attend on Wednesday?

c) How many KS4 members do not attend on Wednesday?

d) How many members attend on Wednesday altogether?

e) How many do not attend on Wednesday altogether?

