Tree Diagrams

Key Vocab

Probability: the chance that something will happen

Relative Frequency: how often something happens divided by the outcomes

Independent: an event that is not affected by any other events

Chance: the likelihood of a particular outcome

Event: the outcome of a probability - a set of possible outcomes

Biased: a built-in error that makes all values wrong by a certain amount

Mutually Exclusive: events that do not occur at the same time

Bias: a built-in error that makes all values wrong (unequal) by a certain amount

Fair: there is zero bias, and all outcomes have an equal likelihood

Random: something happens by chance and is unable to be predicted

Key Knowledge

Probability tree diagrams are a way of organising the information of two or more probability events. Probability tree diagrams show all the possible outcomes of the events and can be used to solve probability questions

To use tree diagrams, we need to know the probability of individual events occurring and use the fact that **probabilities on each set of branches add up to 1.1.**

Probability tree diagrams start by showing the possible outcomes for the first event, with the outcomes at the ends of the branches and the **probabilities written along the branches.** The probabilities of the events can be written as **fractions or decimals**

The AND rule for probability states that P (A and B) =P(A) P(B)

THINK multiply across the branches

The OR rule for probability states that P (A or B) =P(AB)+P(BB)

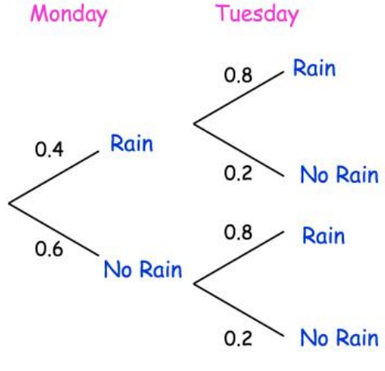
THINK add down the branches

Examples

I DO

The probability that it rains on Monday is 0.4
The probability that it rains on Tuesday is 0.8

The probability tree diagram shows this information.

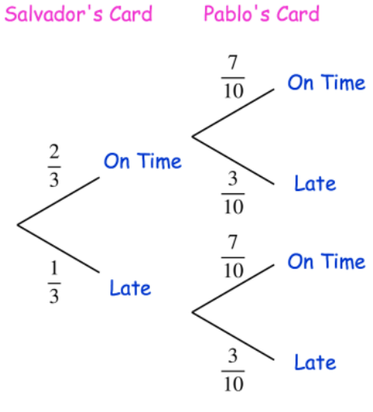


Work out the probability that there will be **no rain** on Monday and **no rain** on Tuesday.

WE DO

Ross posts a birthday card to Salvador and a birthday card to Pablo.

The probability tree shows the probabilities of each card arriving on time or late.



Work out the probability that both cards arrive **on time**.

Examples

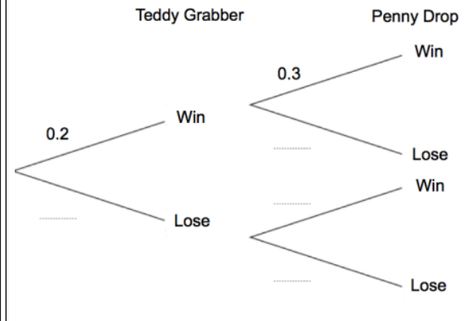
I DO

James goes to an arcade.

He has one go on the Teddy Grabber.
He has one go on the Penny Drop.

The probability that he wins on the Teddy Grabber is 0.2.
The probability that he wins on the Penny Drop is 0.3.

(a) Complete the tree diagram.



(2)

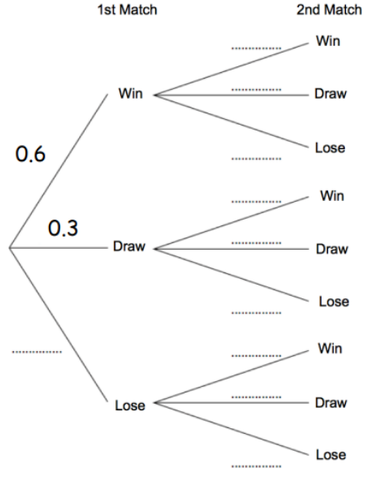
(b) Work out the probability that James wins on the Teddy Grabber and he also wins on the Penny Drop.

WE DO

A football team has two matches to play.

The probability that the team wins is 0.6
The probability that the team draws is 0.3

(a) Complete the tree diagram.

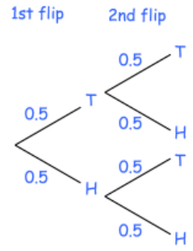


(2)

(b) Work out the probability that the team will win both matches.

YOU DO a

A fair coin is flipped twice.



(a) Find the probability of getting two heads

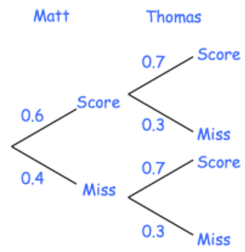
(b) Find the probability of getting a head and then a tail

(c) Find the probability of getting at least one head

YOU DO b

Matt and Thomas each take a penalty.

The probability that Matt scores is 0.6
The probability that Thomas scores is 0.7



(a) Find the probability of both boys missing

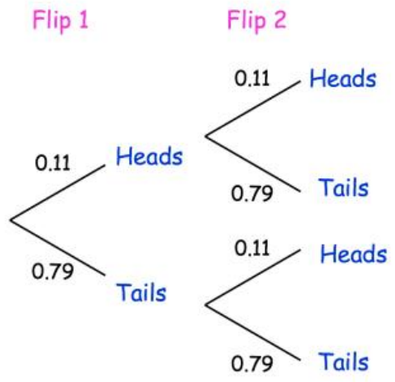
(b) Find the probability of one boy scoring

(c) Find the probability of at least one boy missing

YOU DO c

Alfie has a biased coin.
When flipped, the probability that the coin lands on tails is 0.79

Alfie flips the coin twice and draws this tree diagram.



Give a criticism of Alfie's tree diagram.

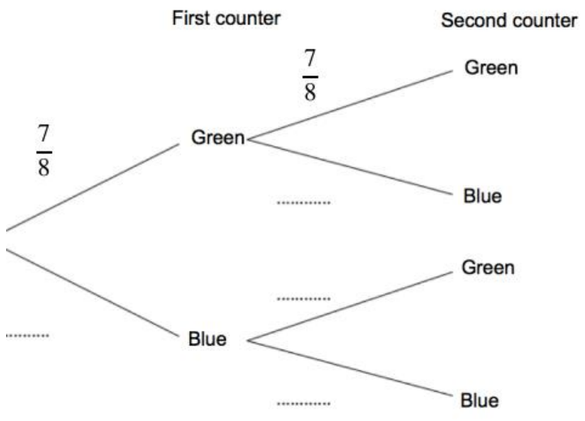
YOU DO d

There are green and blue counters in a container.

Kevin takes at random a counter from the container.
He replaces the counter in the container.

Kevin takes at random a second counter from the container.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Kevin picks counters that are different colour.

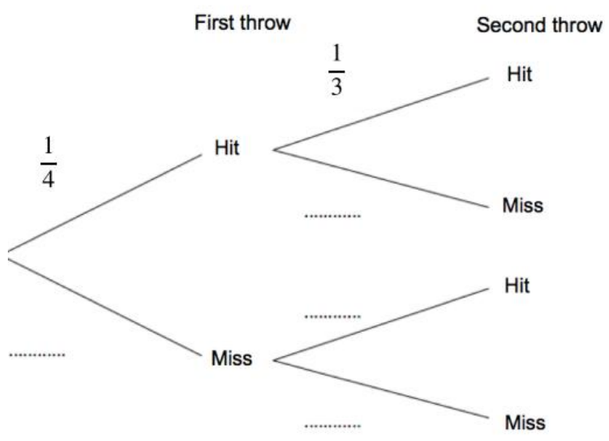
YOU DO e

Jennifer is playing darts.
She throws two darts aiming for a Bullseye.

The probability Jennifer hits the Bullseye on her first throw is $\frac{1}{4}$

The probability she hits the Bullseye on her second throw is $\frac{1}{3}$

(a) Complete the tree diagram.



(b) Work out the probability Jennifer hits the Bullseye at least once.

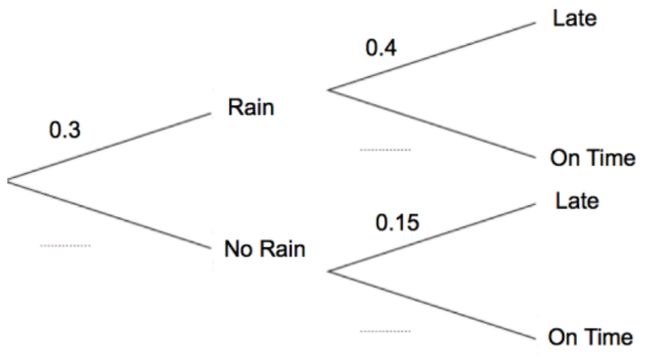
YOU DO f

In a small village, one bus arrives a day.

The probability of rain in the village is 0.3.

If it rains, the probability of a bus being late is 0.4.
If it does not rain, the probability of a bus being late is 0.15.

(a) Complete the tree diagram



(2)

(b) Work out the number of days the bus should be late over a period of 200 days.