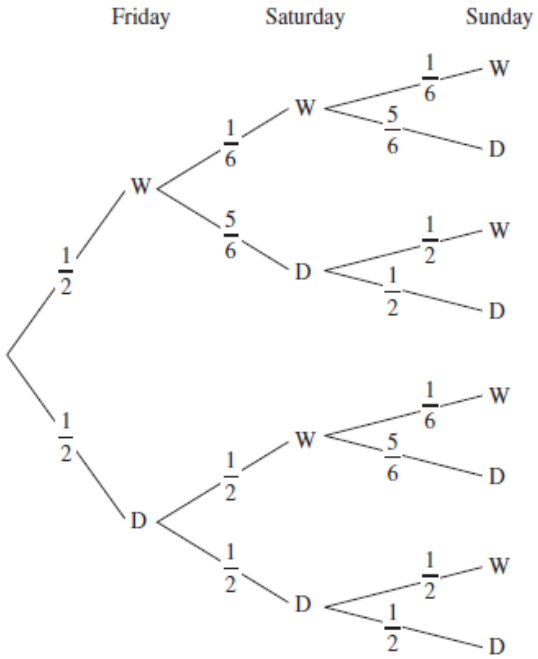
2015 14 b Weather records for a town suggest that:

- if a particular day is wet (*W*), the probability of the next day being dry is $\frac{5}{6}$.
- if a particular day is dry (*D*), the probability of the next day being dry is $\frac{1}{2}$.

In a specific week Thursday is dry. The tree diagram shows the possible outcomes for the next three days: Friday, Saturday and Sunday.



(i) Show that the probability of Saturday being dry is $\frac{2}{3}$. **1**

(ii) What is the probability of both Saturday and Sunday being wet? **2**

(iii) What is the probability of at least one of Saturday and Sunday being dry? **1**

(i) P(Sat dry) = P(*WD*) + P(*DD*)

$= \frac{1}{2} \times \frac{5}{6} + \frac{1}{2} \times \frac{1}{2}$

$= \frac{2}{3}$

State Mean: **0.85**

(ii) P(Sat and Sun wet)

= P(*WWW*) + P(*DWW*)

$= \frac{1}{2} \times \frac{1}{6} \times \frac{1}{6} + \frac{1}{2} \times \frac{1}{2} \times \frac{1}{6}$

$= \frac{1}{18}$

$\therefore$ the probability that Saturday and Sunday are both wet is $\frac{1}{18}$.

State Mean: **1.53**

(iii) P(at least one of Sat and Sun dry)

= 1 – P(Sat and Sun wet)

$= 1 - \frac{1}{18}$ (from part (ii))

$= \frac{17}{18}$

$\therefore$ the probability that at least one of Saturday and Sunday being dry is $\frac{17}{18}$.

State Mean: **0.69**

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

(b)(i) In the better responses, candidates correctly stated $P(Saturday\ dry) = P(WD) + P(DD)$ and then wrote the correct combination of fractions and operations using the probability tree. Candidates are advised to always use probability notation so that it is very clear how they obtained each fraction in their working.

Common problems were:

- writing any combination of fractions from the tree diagram that gave an answer of $\frac{2}{3}$
- not showing full setting out
- not using addition or multiplication of fractions appropriately.

(b)(ii) Many candidates first wrote the branches needed to have both Saturday and Sunday wet, namely $P(both\ Saturday\ \&\ Sunday\ wet) = P(WWW) + P(DWW)$, before attempting to write the associated numerical expression.

Common problems were:

- numerical errors in simple calculations involving fractions
- only calculating one half of the required probability
- ignoring Friday's probability in calculations
- not completing and not explaining working.

(b)(iii) In better responses, candidates realised that part (b)(ii) directly related to part (b)(iii) and required the use of the complement. Candidates are advised to show working for all questions including writing the complement statement explicitly. Candidates who opted for the alternate method of using six tree branches to find the probability of at least one of Saturday or Sunday dry generally made numerical errors or omitted some of the required branches.

Common problems were:

- writing an answer without any working
- not linking (b)(iii) with (b)(ii) and using the longer approach.