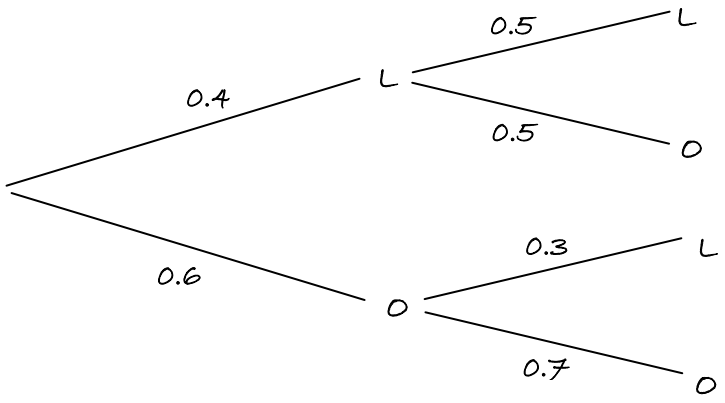
Section 1: Conditional probability

Solutions to Exercise level 2

1. $P(A \cup B) = 1 - P(A' \cap B') = 1 - 0.2 = 0.8$
$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$0.8 = 0.5 + 0.35 - P(A \cap B)$
$P(A \cap B) = 0.05$

2. 30 students select English, so $P(E) = \frac{30}{50} = \frac{3}{5}$
15 students select History, so $P(H) = \frac{15}{50} = \frac{3}{10}$
$P(E) \times P(H) = \frac{3}{5} \times \frac{3}{10} = \frac{9}{50}$
9 students select both English and History, so $P(E \cap H) = \frac{9}{50} = P(E) \times P(H)$
so E and H are independent events.

3. (i)



(ii) (A) $P(\text{exactly one journey is on time}) = (0.4 \times 0.5) + (0.6 \times 0.3)$
$= 0.2 + 0.18$
$= 0.38$

(B) Let A be the event that the first journey is on time
Let B be the event that the second journey is on time
$P(A \cap B) = 0.6 \times 0.7 = 0.42$
$P(B) = 0.4 \times 0.5 + 0.6 \times 0.7 = 0.2 + 0.42 = 0.62$
$P(A \mid B) = \frac{P(A \cap B)}{P(B)} = \frac{0.42}{0.62} = 0.677$ (3 s.f.)

Edexcel A level Maths Probability 1 Exercise solutions

4. (i) $P(\text{female studying maths}) = 0.44 \times \frac{1}{11} = 0.04$

(ii) $P(\text{male not studying maths or female not studying maths})$

$= 0.56 \times \frac{4}{5} + 0.44 \times \frac{10}{11}$

$= 0.448 + 0.4$

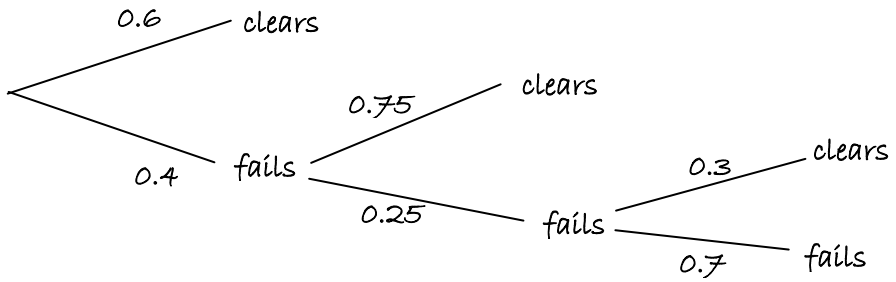
$= 0.848$

(iii) $P(\text{male given maths}) = \dfrac{P(\text{male studying maths})}{P(\text{studyingmaths})}$

$= \dfrac{0.56 \times \frac{1}{5}}{1 - 0.848}$

$= 0.737$ (3 s.f.)

5. (i)



(ii) (A) $P(\text{fails on all 3 attempts}) = 0.4 \times 0.25 \times 0.7 = 0.07$

$P(\text{clears height}) = 1 - 0.07 = 0.93$

(B) Let A be the event that she clears the height

Let B be the event that she clears the height on the first attempt

$P(A \cap B) = 0.6$

$P(B) = 0.93$ (from part (A)

$P(B \mid A) = \dfrac{P(A \cap B)}{P(A)} = \dfrac{0.6}{0.93} = 0.645$ (3 s.f.)