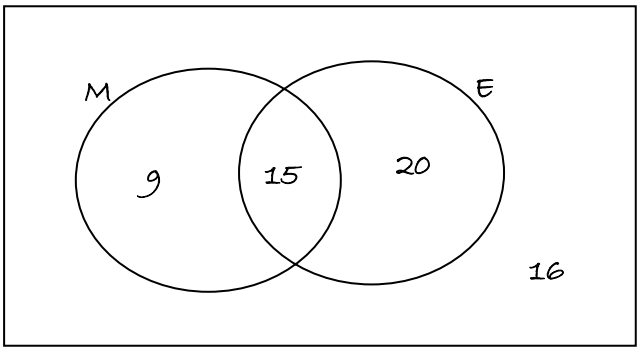
EdExcel Statistics 1

Probability

Section 2: Conditional Probability

Solutions to Exercise

1.



There are 24 students who study Maths. Of these, 15 study English.

$P(E \mid M) = \frac{15}{24} = \frac{5}{8}$

2. 5 men and 8 women prefer films, so 13 people prefer films.

$P(\text{man} \mid \text{prefer films}) = \frac{5}{13}$

3. 30 student select English, so $P(E) = \frac{30}{50} = \frac{3}{5}$

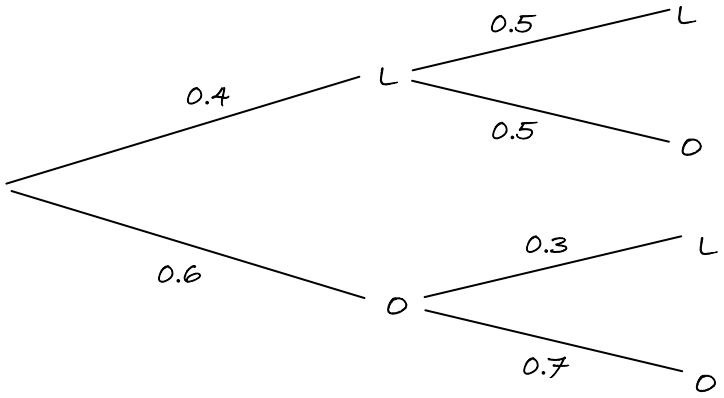
15 students select History, so $P(H) = \frac{15}{50} = \frac{3}{10}$

$P(E) \times P(H) = \frac{3}{5} \times \frac{3}{10} = \frac{9}{50}$

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.

4.



(i) P(exactly one journey is on time) $= (0.4 \times 0.5) + (0.6 \times 0.3)$

$= 0.2 + 0.18$

$= 0.38$

(ii) Let A be the event that the first journey is on time

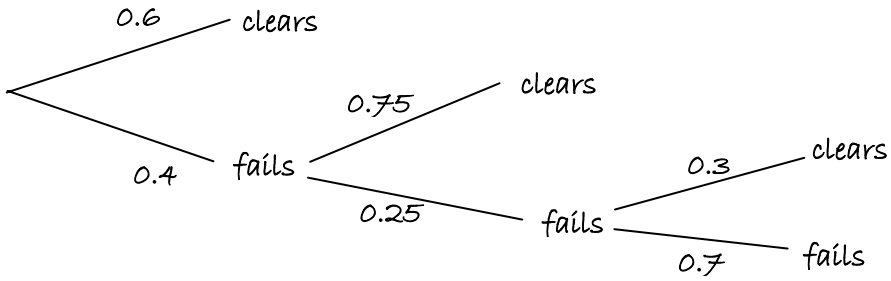
Let B be the event that the second journey is on time

$P(A \cap B) = 0.6 \times 0.7 = 0.42$

$P(B) = 0.4 \times 0.5 + 0.6 \times 0.7 = 0.2 + 0.42 = 0.62$

$P(A \mid B) = \dfrac{P(A \cap B)}{P(B)} = \dfrac{0.42}{0.62} = 0.677$ (3 s.f.)

5.



(i) P(fails on all 3 attempts) $= 0.4 \times 0.25 \times 0.7 = 0.07$

P(clears height) $= 1 - 0.07 = 0.93$

(ii) 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 (i))

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