2. The table shows information
    about a group of adults.

	Can drive	Cannot drive	
Male	32	8	40
Female	38	12	50
	70	20	90

    (i)   A person is chosen at random
          from the group.
          What is the probability that the person can drive?
    (ii) A man in the group is chosen at random.
          What is the probability that he can drive?
    (iii) Find the probability that a person chosen at random can drive, given that the
          person is a female.

i $\quad P(\text{Can drive}) = \dfrac{70}{90} = \dfrac{7}{9}$

ii $\quad P(\text{Can drive}|\text{man}) = \dfrac{32}{40} = \dfrac{4}{5}$

iii $\quad P(\text{Can drive}|\text{female}) = \dfrac{38}{50} = \dfrac{19}{25}$

4. A school enters 120 pupils for the Junior
    Certificate maths exam.
    The given table shows the details of the entries.

	Ordinary	Higher	
Girls	20	35	55
Boys	25	40	65
	45	75	120

    (i)   Write down the probability that a pupil
          chosen at random is entered for Ordinary level.
    (ii) A pupil is chosen at random. This pupil is a girl.
          Find the probability that the girl was entered for Higher level.
    (iii) A pupil is chosen at random. The pupil was entered for Ordinary level.
          Find the probability that the pupil was a boy.

(i) $\quad P(O.L.) = \dfrac{45}{120} = \dfrac{3}{8}$

(ii) $\quad P(H.L.|\text{girl}) = \dfrac{35}{55} = \dfrac{7}{11}$

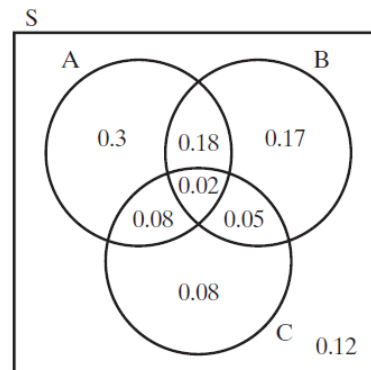(iii) $\quad P(\text{Boy}|O.L.) = \dfrac{25}{45} = \dfrac{5}{9}$

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5. A bag contains 5 red discs and 3 blue discs.
A disc is taken from the bag and not replaced. A second disc is then taken from the bag.
Find the probability that
   (i)   the first disc is red
   (ii) the first 2 discs are red
   (iii) the first two discs are blue
   (iv) both discs are the same colour.

8 Discs in total

Ist disc   2nd disc   P(outcome)

$$P(RR) = \left(\frac{5}{8}\right)\left(\frac{4}{7}\right) = \frac{20}{56}$$

$$P(RB) = \left(\frac{5}{8}\right)\left(\frac{3}{7}\right) = \frac{15}{56}$$

$$P(BR) = \left(\frac{3}{8}\right)\left(\frac{5}{7}\right) = \frac{15}{56}$$

$$P(BB) = \left(\frac{3}{8}\right)\left(\frac{2}{7}\right) = \frac{6}{56}$$

(i) $P(R) = 5/8$

(ii) $P(RR) = \frac{20}{56} = \frac{5}{14}$

(iii) $P(BB) = \frac{6}{56} = \frac{3}{28}$

(iv) $P(same) = P(RR \text{ or } BB) = \frac{5}{14} + \frac{3}{28} = \frac{13}{28}$

20. The probabilities of events A, B and C are shown in the given Venn diagram.

Use the Venn diagram to find
   (i) $P(B)$
   (ii) $P(A \cap C)$
   (iii) $P(A \mid B)$
   (iv) $P(C \mid B)$
   (v) $P(A \cap C')$
   (vi) $P(B \mid A \cap C)$.

S
A   B
0.3   0.18   0.17
         0.02
      0.08   0.05
         0.08
              C 0.12

$P(A|B) = \frac{P(A \cap B)}{P(B)}$

(i) $P(B) = 0.18 + 0.02 + 0.17 + 0.05 = 0.42$

(ii) $P(A \cap C) = 0.02 + 0.08 = 0.1$

(iii) $P(A|B) = \frac{[0.18 + 0.02]}{0.42} = \frac{0.2}{0.42} = \frac{10}{21}$

(iv) $P(C|B) = \frac{[0.02 + 0.05]}{0.42} = \frac{0.07}{0.42} = \frac{1}{6}$

(v) $P(A \cap C') = 0.3 + 0.18 = 0.48$

(vi) $P(B|A \cap C) = \frac{0.02}{[0.08 + 0.02]} = \frac{0.02}{0.1} = \frac{1}{5}$