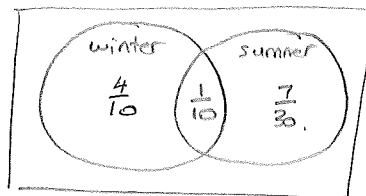


1.  $P(\text{winter sport}) = \frac{1}{2}$

$P(\text{summer sport}) = \frac{1}{3}$

$P(\text{both winter + summer sports}) = \frac{1}{10}$



$$\frac{1}{2} - \frac{1}{10} = \frac{4}{10}$$

$$\frac{1}{3} - \frac{1}{10} = \frac{10}{30} - \frac{3}{30} = \frac{7}{30}$$

$$\begin{aligned} P(\text{sporty person selected}) &= \frac{4}{10} + \frac{1}{10} + \frac{7}{30} \\ &= \frac{5}{10} + \frac{7}{30} \\ &= \frac{15}{30} + \frac{7}{30} \\ &= \frac{22}{30} \\ &= \underline{\underline{\frac{11}{15}}} \end{aligned}$$

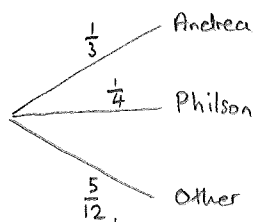
2.  $P(A \text{ wins prize}) = \frac{1}{3}$

$P(\text{Philson wins prize}) = \frac{1}{4}$

only one person can win the prize

$\Rightarrow$  events are mutually exclusive

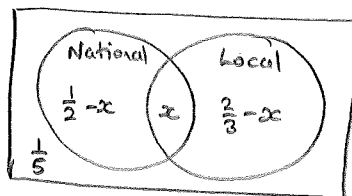
$$\begin{aligned} P(\text{one will win it}) &= \frac{1}{3} + \frac{1}{4} \\ &= \underline{\underline{\frac{7}{12}}} \end{aligned}$$



3.  $P(\text{no newspapers}) = \frac{1}{5}$

$P(\text{national paper}) = \frac{1}{2}$

$P(\text{local paper}) = \frac{2}{3}$



if  $P(\text{no newspapers}) = \frac{1}{5}$

$\Rightarrow P(\text{at least one newspaper}) = \frac{4}{5}$

$$\Rightarrow \left(\frac{1}{2} - x\right) + x + \left(\frac{2}{3} - x\right) = \frac{4}{5}$$

$$\Rightarrow \frac{3}{6} + \frac{4}{6} - x = \frac{4}{5}$$

$$\Rightarrow x = \frac{7}{6} - \frac{4}{5} = \frac{35 - 24}{30} = \frac{11}{30}$$

so  $P(\text{both newspapers}) = \underline{\underline{\frac{11}{30}}}$

# Ex 1C cont.

4. exhaustive  $\Rightarrow P(X \cup Y) = 1$ .

mutually exclusive  $\Rightarrow P(X \cap Y) = 0$ .

a)  $P(A \cap D)$

$= P(\text{total is 3 and red die is multiple of 3})$

$= 0$  as these cannot happen at the same time

$\Rightarrow A \& D$  are mutually exclusive.

A: total is 3

	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

$$P(A) = \frac{2}{36}$$

D:

	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

$$P(D) = \frac{12}{36}$$

b)  $P(C \cap E)$

$= P(\text{total is } \leq 9 \text{ and total } \geq 11)$

$= 0$  as these cannot happen at the same time

$\Rightarrow C \& E$  are mutually exclusive.

c)  $P(A \cap B)$

$= P(\text{total is 3 and red is a multiple of 2})$

$$= \frac{1}{36}$$

$$\neq 0 \text{ or } 1$$

$\Rightarrow A$  and  $B$  are neither exhaustive or mutually exclusive.

d)  $P(C \cup F)$

$$P(C \cap F) = 0$$

$= P(\text{total } \leq 9 \text{ or total is } \geq 10)$

$$= 1$$

$\Rightarrow C$  and  $F$  are exhaustive and mutually exclusive

e)  $P(B \cap D)$

$= P(\text{red is multiple of 2 and red is a multiple of 3})$

$$= \frac{1}{6}$$

$$\neq 0$$

$$P(B \cup D) = \frac{4}{6} \neq 1$$

$\Rightarrow B$  and  $D$  are neither exhaustive or mutually exclusive

f)  $P(\text{total is 3 and total } \geq 10) = 0$

$\Rightarrow A$  and  $E$  are mutually exclusive.