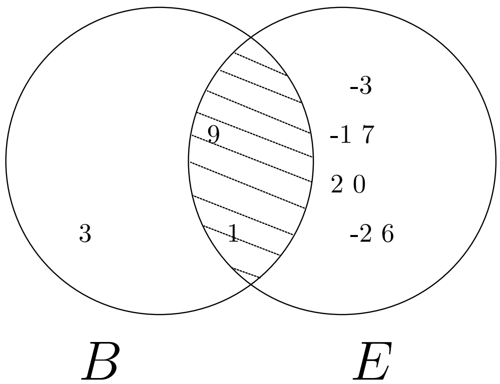
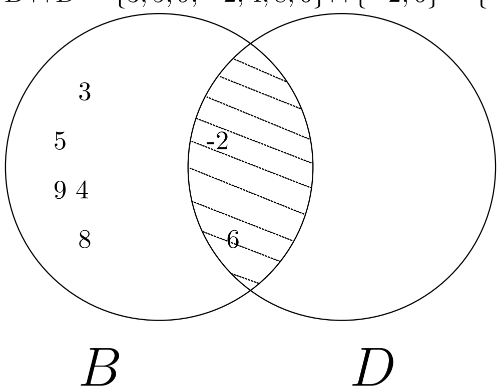
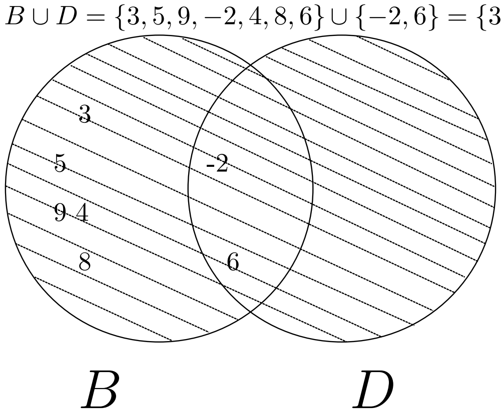
1. (**1**) $B \cap E = \{3, 9, 1\} \cap \{-3, -1, 7, 2, 0, 9, -2, 1, 6\} = \{9, 1\}$
On Venn diagram:



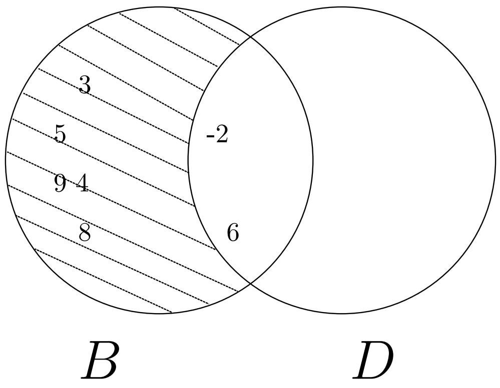
(**2**) **i**. $B \cap D = \{3, 5, 9, -2, 4, 8, 6\} \cap \{-2, 6\} = \{-2, 6\}$



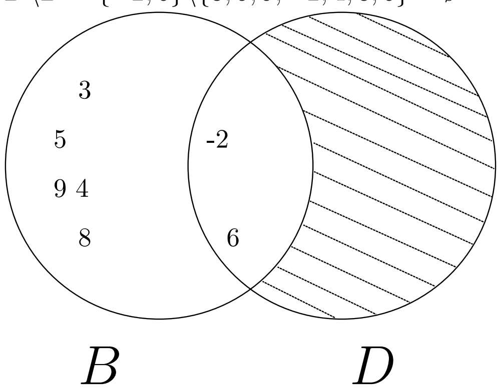
ii. $B \cup D = \{3, 5, 9, -2, 4, 8, 6\} \cup \{-2, 6\} = \{3, 5, 9, -2, 4, 8, 6\}$



iii. $B \backslash D = \{3, 5, 9, -2, 4, 8, 6\} \backslash \{-2, 6\} = \{3, 5, 9, 4, 8\}$



iv. $D\backslash B = \{-2, 6\}\backslash\{3, 5, 9, -2, 4, 8, 6\} = \emptyset$



(**3**) **i**. $G = \{3, -1\}$

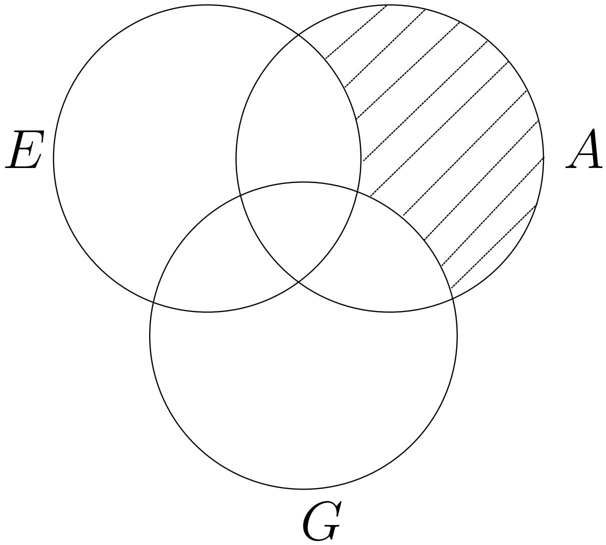
ii. $G \cup A = \{3, -1\} \cup \{3, 5, 7, 4, 8, 6\} = \{3, -1, 5, 7, 4, 8, 6\}$

iii. $G \cap A = \{3, -1\} \cap \{3, 5, 7, 4, 8, 6\} = \{3\}$

iv. $G\backslash A = \{3, -1\}\backslash\{3, 5, 7, 4, 8, 6\} = \{-1\}$

v.

$$\begin{aligned} A\backslash (G \cup E) &= \{3, 5, 7, 4, 8, 6\}\backslash (\{3, -1\} \cup \{-2\}) \\ &= \{3, 5, 7, 4, 8, 6\}\backslash\{3, -1, -2\} \\ &= \{5, 7, 4, 8, 6\} \end{aligned}$$



vi.

$$
\begin{aligned}
(G \cup A) \setminus E &= (\{3, -1\} \cup \{3, 5, 7, 4, 8, 6\}) \setminus \{-2\} \\
&= \{3, -1, 5, 7, 4, 8, 6\} \setminus \{-2\} \\
&= \{3, -1, 5, 7, 4, 8, 6\}
\end{aligned}
$$

vii.

$$
\begin{aligned}
E \cup (G \cup A) &= \{-2\} \cup (\{3, -1\} \cup \{3, 5, 7, 4, 8, 6\}) \\
&= \{-2\} \cup \{3, -1, 5, 7, 4, 8, 6\} \\
&= \{3, 5, -1, 7, -2, 4, 8, 6\}
\end{aligned}
$$

viii. $E \cap \emptyset = \{-2\} \cap \emptyset = \emptyset$

ix.

$$
\begin{aligned}
(A \cap G) \cup (A \cap E) &= (\{3, 5, 7, 4, 8, 6\} \cap \{3, -1\}) \cup (\{3, 5, 7, 4, 8, 6\} \cap \{-2\}) \\
&= \{3\} \cup \emptyset \\
&= \{3\}
\end{aligned}
$$

(4) **i**. $Prob\,(s_1 \text{ is even}) = \frac{3}{6} = \frac{1}{2}$

ii. $Prob\,(s_1 = 5) = \frac{1}{6}$

iii. $Prob\,(s_1 < 2) = \frac{1}{6}$

iv. $Prob\,(s_1 \text{ is even and } s_1 < 2) = \frac{0}{6} = 0$

v. $Prob\,(s_1 \text{ is even or } s_1 < 2) = \frac{4}{6} = \frac{2}{3}$

vi. $Prob\,(s_1 \text{ is even given that } s_1 < 2) = \dfrac{0}{1} = 0$

vii. $Prob\,(s_1 \text{ is even}) = \dfrac{1}{2}$, and $Prob\,(s_2 \text{ is even}) = \dfrac{1}{3}$.

Now s_1 and s_2 are chosen independently,

so $Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even }) = Prob\,(s_1 \text{ is even}) \times Prob\,(s_2 \text{ is even})$.

Hence $Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even }) = \dfrac{1}{2} \times \dfrac{1}{3} = \dfrac{1}{6}$

viii. By the principle of inclusion\exclusion,

$Prob\,(s_1 \text{ is even } \textbf{or } s_2 \text{ is even}) = Prob\,(s_1 \text{ is even}) + Prob\,(s_2 \text{ is even}) - Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even })$.

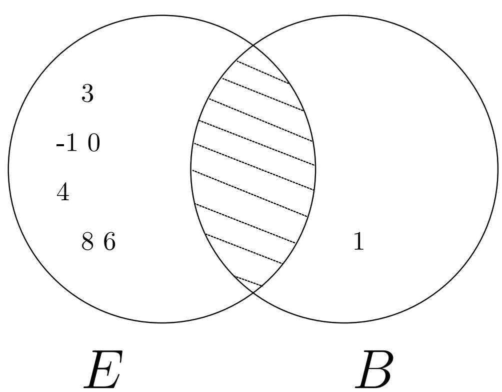
Hence $Prob\,(s_1 \text{ is even } \textbf{or } s_2 \text{ is even}) = \dfrac{1}{2} + \dfrac{1}{3} - \dfrac{1}{6} = \dfrac{2}{3}$

ix. Now s_1 and s_2 are chosen independently, so

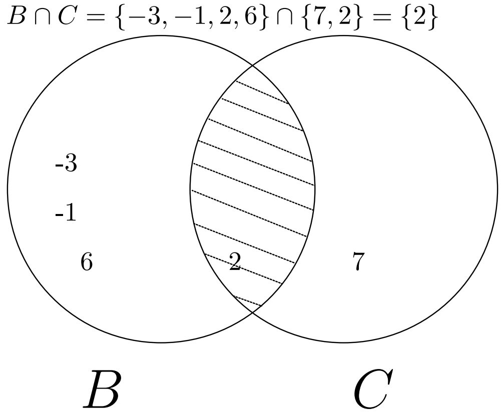
$Prob\,(s_1 \text{ is even } \textbf{given that } s_2 \text{ is even }) = Prob\,(s_1 \text{ is even})$.

Hence $Prob\,(s_1 \text{ is even } \textbf{given that } s_2 \text{ is even }) = \dfrac{1}{2}$

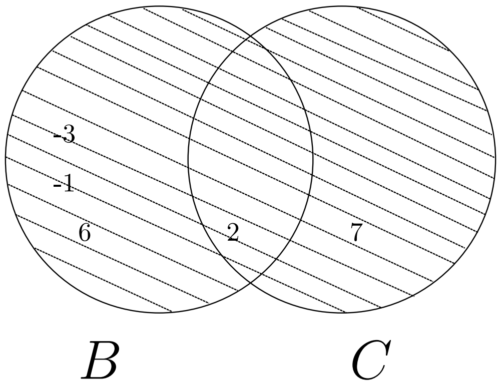
2. (**1**) $E \cap B = \{3, -1, 0, 4, 8, 6\} \cap \{1\} = \emptyset$
On Venn diagram:



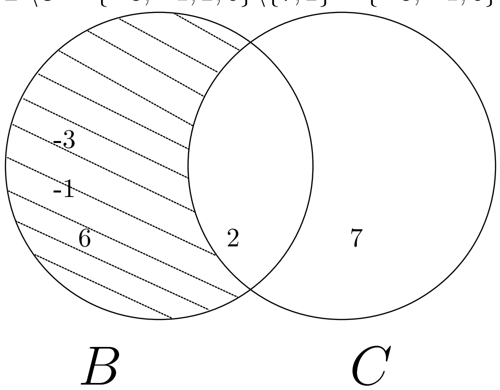
(**2**) **i**. $B \cap C = \{-3, -1, 2, 6\} \cap \{7, 2\} = \{2\}$



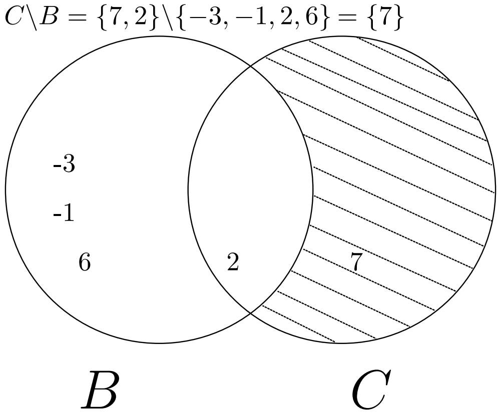
ii. $B \cup C = \{-3, -1, 2, 6\} \cup \{7, 2\} = \{-3, -1, 7, 2, 6\}$



iii. $B\backslash C = \{-3, -1, 2, 6\}\backslash\{7, 2\} = \{-3, -1, 6\}$



iv. $C\backslash B = \{7, 2\}\backslash\{-3, -1, 2, 6\} = \{7\}$



(**3**) **i**. $C = \{3, 5, 4, 6\}$

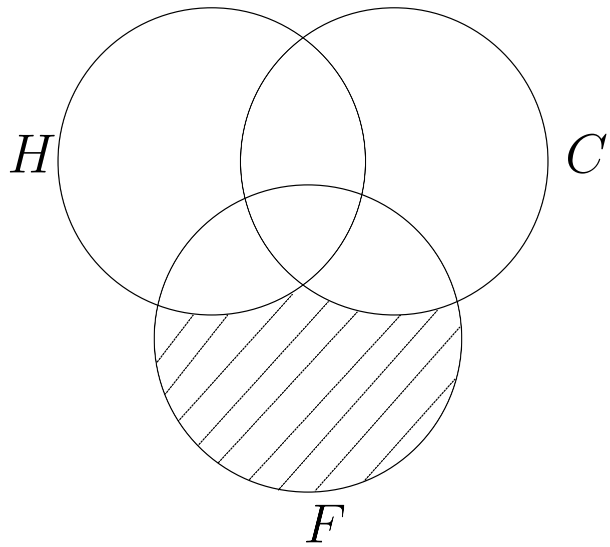
ii. $C \cup F = \{3, 5, 4, 6\} \cup \{7, 4, 6\} = \{3, 5, 7, 4, 6\}$

iii. $F \cap C = \{7, 4, 6\} \cap \{3, 5, 4, 6\} = \{4, 6\}$

iv. $C\backslash F = \{3, 5, 4, 6\}\backslash\{7, 4, 6\} = \{3, 5\}$

v.

$$\begin{aligned} F\setminus(H\cup C) &= \{7,4,6\}\setminus(\{3,7,9\}\cup\{3,5,4,6\}) \\ &= \{7,4,6\}\setminus\{3,5,7,9,4,6\} \\ &= \emptyset \end{aligned}$$



vi.

$$\begin{aligned} (F\cap C)\cap H &= (\{7,4,6\}\cap\{3,5,4,6\})\cap\{3,7,9\} \\ &= \{4,6\}\cap\{3,7,9\} \\ &= \emptyset \end{aligned}$$

vii.

$$\begin{aligned} C\cup(F\cap H) &= \{3,5,4,6\}\cup(\{7,4,6\}\cap\{3,7,9\}) \\ &= \{3,5,4,6\}\cup\{7\} \\ &= \{3,5,7,4,6\} \end{aligned}$$

viii. $\emptyset\cap C = \emptyset\cap\{3,5,4,6\} = \emptyset$

ix.

$$\begin{aligned} (C\cup H)\setminus(F\cup\emptyset) &= (\{3,5,4,6\}\cup\{3,7,9\})\setminus(\{7,4,6\}\cup\emptyset) \\ &= \{3,5,7,9,4,6\}\setminus\{7,4,6\} \\ &= \{3,5,9\} \end{aligned}$$

(4) **i.** $Prob\,(t_1 \text{ is odd}) = \dfrac{1}{2}$

ii. $Prob\,(t_1 = 2) = \dfrac{1}{2}$

iii. $Prob\,(t_1 > 1) = \frac{1}{2}$

iv. $Prob\,(t_1 \text{ is odd and } t_1 > 1) = \frac{0}{2} = 0$

v. $Prob\,(t_1 \text{ is odd or } t_1 > 1) = \frac{2}{2} = 1$

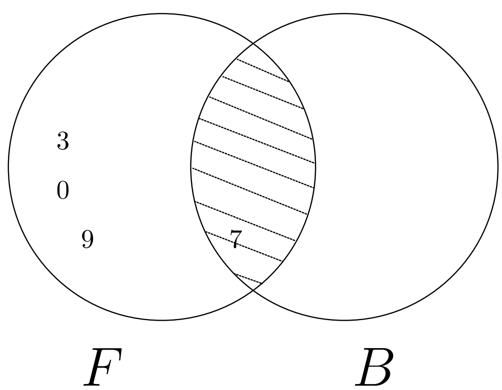
vi. $Prob\,(t_1 \text{ is odd given that } t_1 > 1) = \frac{0}{1} = 0$

vii. $Prob\,(t_1 \text{ is odd}) = \frac{1}{2}$, and $Prob\,(t_2 \text{ is odd}) = \frac{3}{7}$.
Now t_1 and t_2 are chosen independently,
so $Prob\,(\text{both } t_1 \text{ and } t_2 \text{ are odd }) = Prob\,(t_1 \text{ is odd}) \times Prob\,(t_2 \text{ is odd})$.
Hence $Prob\,(\text{both } t_1 \text{ and } t_2 \text{ are odd }) = \frac{1}{2} \times \frac{3}{7} = \frac{3}{14}$

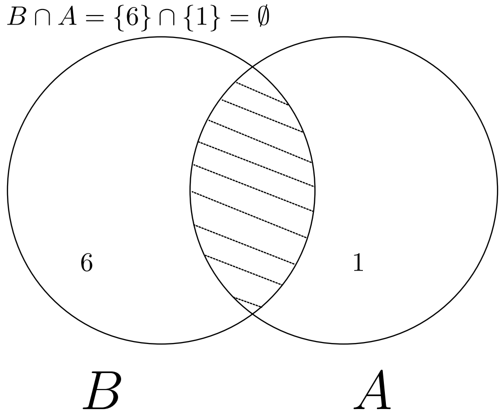
viii. By the principle of inclusion\exclusion,
$Prob\,(t_1 \text{ is odd } \textbf{or } t_2 \text{ is odd}) = Prob\,(t_1 \text{ is odd}) + Prob\,(t_2 \text{ is odd}) - Prob\,(\text{both } t_1 \text{ and } t_2 \text{ are odd })$.
Hence $Prob\,(t_1 \text{ is odd } \textbf{or } t_2 \text{ is odd}) = \frac{1}{2} + \frac{3}{7} - \frac{3}{14} = \frac{5}{7}$

ix. Now t_1 and t_2 are chosen independently, so
$Prob\,(t_1 \text{ is odd } \textbf{given that } t_2 \text{ is odd }) = Prob\,(t_1 \text{ is odd})$.
Hence $Prob\,(t_1 \text{ is odd } \textbf{given that } t_2 \text{ is odd }) = \frac{1}{2}$

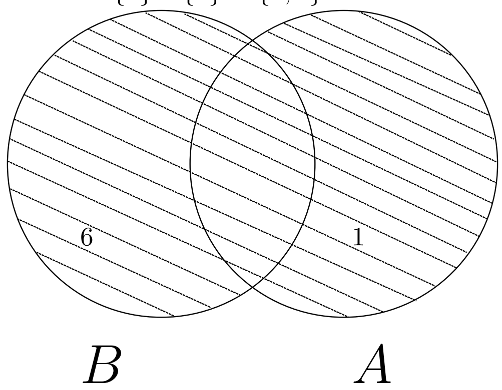
3. (**1**) $F \cap B = \{3, 7, 0, 9\} \cap \{7\} = \{7\}$
On Venn diagram:



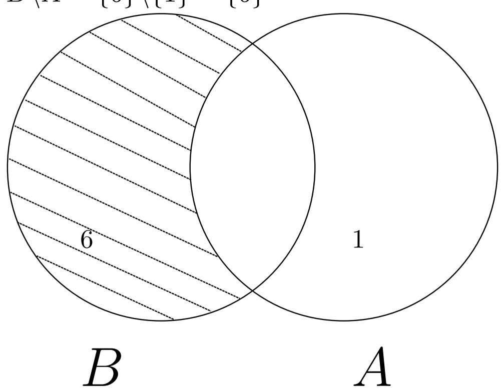
(**2**) **i**. $B \cap A = \{6\} \cap \{1\} = \emptyset$



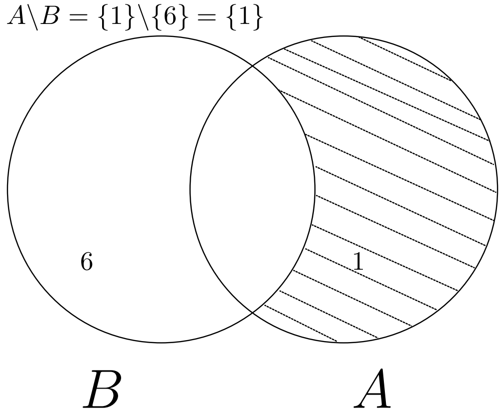
ii. $B \cup A = \{6\} \cup \{1\} = \{6, 1\}$



iii. $B \backslash A = \{6\} \backslash \{1\} = \{6\}$



iv. $A \backslash B = \{1\} \backslash \{6\} = \{1\}$



(**3**) **i**. $C = \{-1, 0, 9, 1\}$

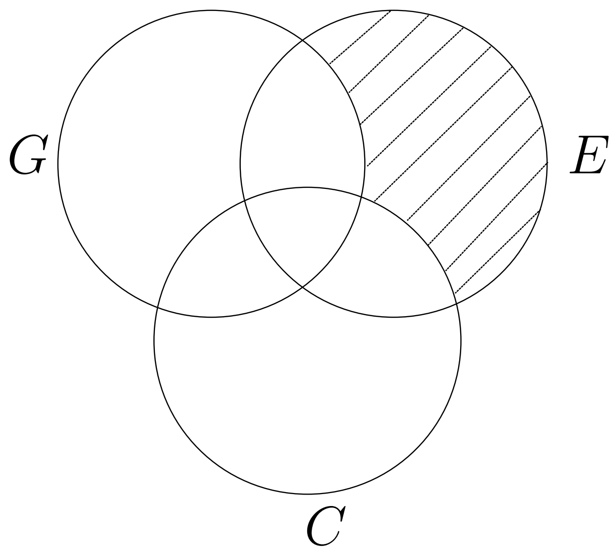
ii. $E \cup C = \{5, 0, 4, 1\} \cup \{-1, 0, 9, 1\} = \{5, -1, 0, 9, 4, 1\}$

iii. $C \cap E = \{-1, 0, 9, 1\} \cap \{5, 0, 4, 1\} = \{0, 1\}$

iv. $E \backslash C = \{5, 0, 4, 1\} \backslash \{-1, 0, 9, 1\} = \{5, 4\}$

v.

$$\begin{aligned} E\setminus(C\cup G) &= \{5,0,4,1\}\setminus(\{-1,0,9,1\}\cup\{9,8\}) \\ &= \{5,0,4,1\}\setminus\{-1,0,9,8,1\} \\ &= \{5,4\} \end{aligned}$$



vi.

$$\begin{aligned} (G\cup C)\cap E &= (\{9,8\}\cup\{-1,0,9,1\})\cap\{5,0,4,1\} \\ &= \{-1,0,9,8,1\}\cap\{5,0,4,1\} \\ &= \{0,1\} \end{aligned}$$

vii.

$$\begin{aligned} C\cup(E\cap G) &= \{-1,0,9,1\}\cup(\{5,0,4,1\}\cap\{9,8\}) \\ &= \{-1,0,9,1\}\cup\emptyset \\ &= \{-1,0,9,1\} \end{aligned}$$

viii. $\emptyset\setminus E = \emptyset\setminus\{5,0,4,1\} = \emptyset$

ix.

$$\begin{aligned} (C\cup E)\setminus(C\cup G) &= (\{-1,0,9,1\}\cup\{5,0,4,1\})\setminus(\{-1,0,9,1\}\cup\{9,8\}) \\ &= \{-1,5,0,9,4,1\}\setminus\{-1,0,9,8,1\} \\ &= \{5,4\} \end{aligned}$$

(4) **i.** $Prob\,(s_1 \text{ is even}) = \frac{2}{4} = \frac{1}{2}$

ii. $Prob\,(s_1 = 10) = 0$

iii. $Prob\,(s_1 < 9) = \dfrac{3}{4}$

iv. $Prob\,(s_1 \text{ is even and } s_1 < 9) = \dfrac{2}{4} = \dfrac{1}{2}$

v. $Prob\,(s_1 \text{ is even or } s_1 < 9) = \dfrac{3}{4}$

vi. $Prob\,(s_1 \text{ is even given that } s_1 < 9) = \dfrac{2}{3}$

vii. $Prob\,(s_1 \text{ is even}) = \dfrac{1}{2}$, and $Prob\,(s_2 \text{ is even}) = \dfrac{1}{3}$.

Now s_1 and s_2 are chosen independently,

so $Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even }) = Prob\,(s_1 \text{ is even}) \times Prob\,(s_2 \text{ is even})$.

Hence $Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even }) = \dfrac{1}{2} \times \dfrac{1}{3} = \dfrac{1}{6}$

viii. By the principle of inclusion\exclusion,

$Prob\,(s_1 \text{ is even } \textbf{or } s_2 \text{ is even}) = Prob\,(s_1 \text{ is even}) + Prob\,(s_2 \text{ is even}) - Prob\,(\text{both } s_1 \text{ and } s_2 \text{ are even })$.

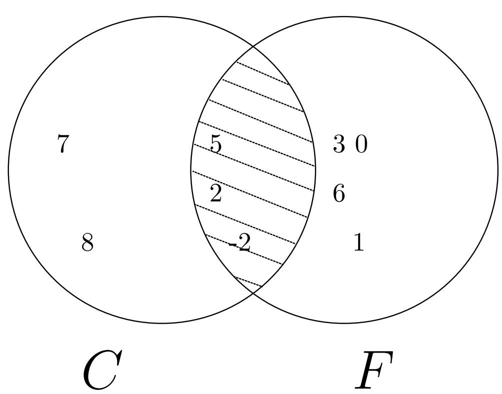
Hence $Prob\,(s_1 \text{ is even } \textbf{or } s_2 \text{ is even}) = \dfrac{1}{2} + \dfrac{1}{3} - \dfrac{1}{6} = \dfrac{2}{3}$

ix. Now s_1 and s_2 are chosen independently, so

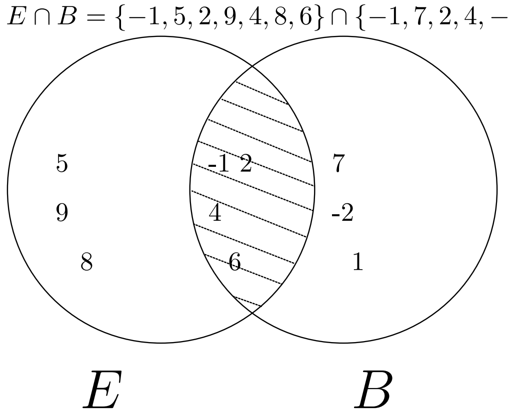
$Prob\,(s_1 \text{ is even } \textbf{given that } s_2 \text{ is odd }) = Prob\,(s_1 \text{ is even})$.

Hence $Prob\,(s_1 \text{ is even } \textbf{given that } s_2 \text{ is odd }) = \dfrac{1}{2}$

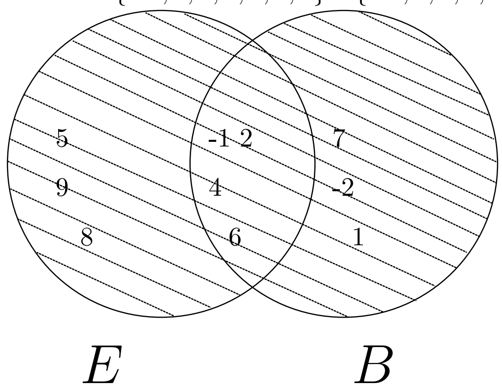
4. (**1**) $C \cap F = \{5, 7, 2, -2, 8\} \cap \{3, 5, 2, 0, -2, 1, 6\} = \{5, 2, -2\}$
On Venn diagram:



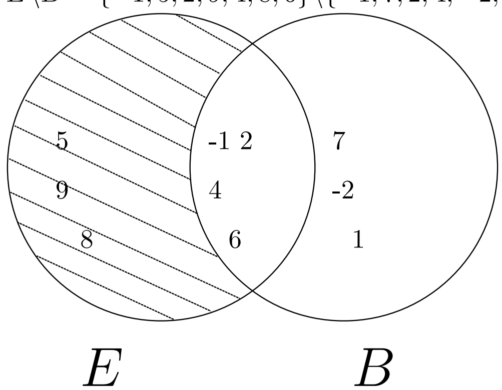
(**2**) **i**. $E \cap B = \{-1, 5, 2, 9, 4, 8, 6\} \cap \{-1, 7, 2, 4, -2, 6, 1\} = \{-1, 2, 4, 6\}$



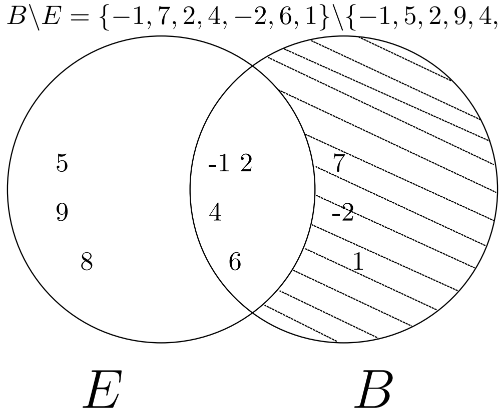
ii. $E \cup B = \{-1, 5, 2, 9, 4, 8, 6\} \cup \{-1, 7, 2, 4, -2, 6, 1\} = \{-1, 5, 7, 2, 9, 4, -2, 8, 6, 1\}$



iii. $E \backslash B = \{-1, 5, 2, 9, 4, 8, 6\} \backslash \{-1, 7, 2, 4, -2, 6, 1\} = \{5, 9, 8\}$



iv. $B \backslash E = \{-1, 7, 2, 4, -2, 6, 1\} \backslash \{-1, 5, 2, 9, 4, 8, 6\} = \{7, -2, 1\}$



(**3**) **i**. $F = \{5, 7, 2, 0, 9, 4, 8, 6\}$

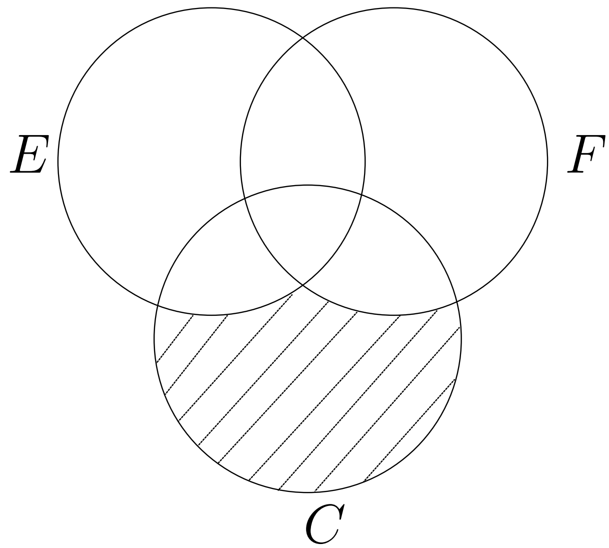
ii. $C \cup E = \{-3, -1, 2, 0, -2, 1\} \cup \{3, 7, 2, 9, 1\} = \{-3, 3, -1, 7, 2, 0, 9, -2, 1\}$

iii. $C \cap F = \{-3, -1, 2, 0, -2, 1\} \cap \{5, 7, 2, 0, 9, 4, 8, 6\} = \{2, 0\}$

iv. $F \backslash E = \{5, 7, 2, 0, 9, 4, 8, 6\} \backslash \{3, 7, 2, 9, 1\} = \{5, 0, 4, 8, 6\}$

v.

$$\begin{aligned} C\setminus(F\cup E) &= \{-3,-1,2,0,-2,1\}\setminus(\{5,7,2,0,9,4,8,6\}\cup\{3,7,2,9,1\}) \\ &= \{-3,-1,2,0,-2,1\}\setminus\{3,5,7,2,0,9,4,8,6,1\} \\ &= \{-3,-1,-2\} \end{aligned}$$



vi.

$$\begin{aligned} (F\cup E)\cap C &= (\{5,7,2,0,9,4,8,6\}\cup\{3,7,2,9,1\})\cap\{-3,-1,2,0,-2,1\} \\ &= \{3,5,7,2,0,9,4,8,6,1\}\cap\{-3,-1,2,0,-2,1\} \\ &= \{2,0,1\} \end{aligned}$$

vii.

$$\begin{aligned} F\cup(C\cap E) &= \{5,7,2,0,9,4,8,6\}\cup(\{-3,-1,2,0,-2,1\}\cap\{3,7,2,9,1\}) \\ &= \{5,7,2,0,9,4,8,6\}\cup\{2,1\} \\ &= \{5,7,2,0,9,4,8,6,1\} \end{aligned}$$

viii. $\emptyset\cup C = \emptyset\cup\{-3,-1,2,0,-2,1\} = \{-3,-1,2,0,-2,1\}$

ix.

$$\begin{aligned} (C\cup F)\cap(F\cap E) &= (\{-3,-1,2,0,-2,1\}\cup\{5,7,2,0,9,4,8,6\})\cap(\{5,7,2,0,9,4,8,6\}\cap\{3,7,2,9,1\}) \\ &= \{-1,7,2,0,-2,1,6,-3,5,9,4,8\}\cap\{7,2,9\} \\ &= \{7,2,9\} \end{aligned}$$

(4) **i.** $Prob\,(r_1 \text{ is odd}) = \frac{2}{5}$

ii. $Prob\,(r_1 = 6) = \frac{1}{5}$

iii. $Prob\,(r_1 > 2) = \frac{4}{5}$

iv. $Prob\,(r_1 \text{ is odd and } r_1 > 2) = \frac{2}{5}$

v. $Prob\,(r_1 \text{ is odd or } r_1 > 2) = \frac{4}{5}$

vi. $Prob\,(r_1 \text{ is odd given that } r_1 > 2) = \frac{2}{4} = \frac{1}{2}$

vii. $Prob\,(r_1 \text{ is odd}) = \frac{2}{5}$, and $Prob\,(r_2 \text{ is odd}) = \frac{3}{6} = \frac{1}{2}$.

Now r_1 and r_2 are chosen independently,

so $Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd }) = Prob\,(r_1 \text{ is odd}) \times Prob\,(r_2 \text{ is odd})$.

Hence $Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd }) = \frac{2}{5} \times \frac{1}{2} = \frac{1}{5}$

viii. By the principle of inclusion\exclusion,

$Prob\,(r_1 \text{ is odd } \textbf{or } r_2 \text{ is odd}) = Prob\,(r_1 \text{ is odd}) + Prob\,(r_2 \text{ is odd}) - Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd })$.

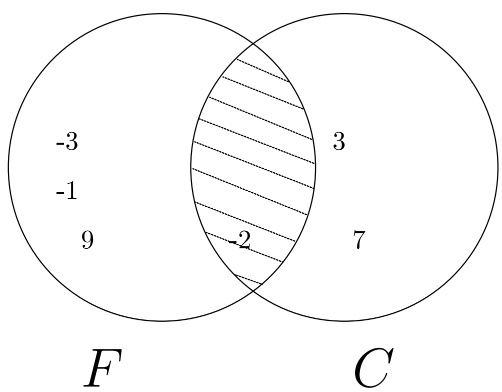
Hence $Prob\,(r_1 \text{ is odd } \textbf{or } r_2 \text{ is odd}) = \frac{2}{5} + \frac{1}{2} - \frac{1}{5} = \frac{7}{10}$

ix. Now r_1 and r_2 are chosen independently, so

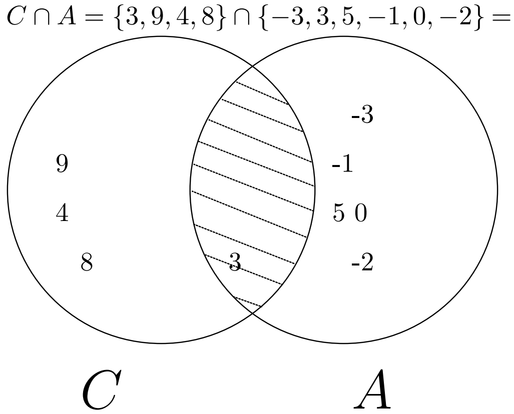
$Prob\,(r_1 \text{ is odd } \textbf{given that } r_2 \text{ is even }) = Prob\,(r_1 \text{ is odd})$.

Hence $Prob\,(r_1 \text{ is odd } \textbf{given that } r_2 \text{ is even }) = \frac{2}{5}$

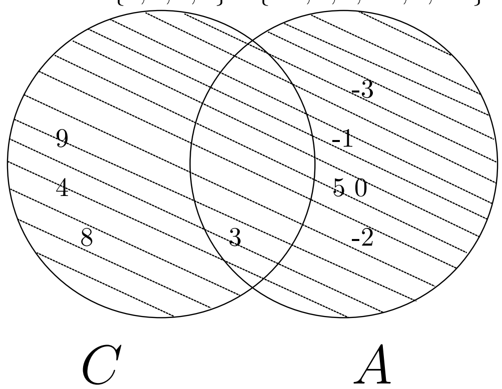
5. **(1)** $F \cap C = \{-3, -1, 9, -2\} \cap \{3, 7, -2\} = \{-2\}$
On Venn diagram:



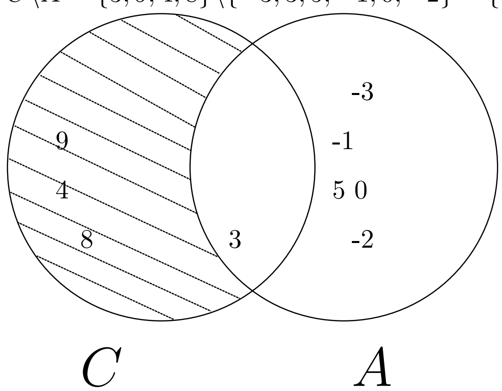
(2) **i.** $C \cap A = \{3, 9, 4, 8\} \cap \{-3, 3, 5, -1, 0, -2\} = \{3\}$



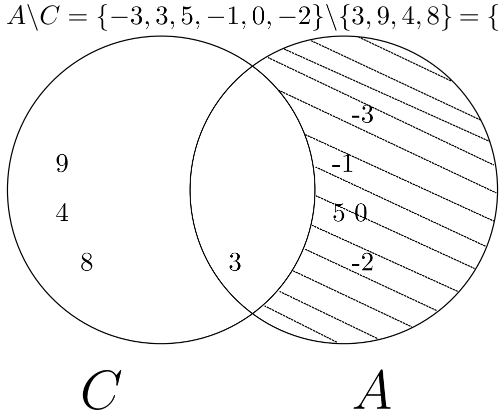
ii. $C \cup A = \{3, 9, 4, 8\} \cup \{-3, 3, 5, -1, 0, -2\} = \{3, -3, -1, 5, 0, 9, 4, -2, 8\}$



iii. $C \backslash A = \{3, 9, 4, 8\} \backslash \{-3, 3, 5, -1, 0, -2\} = \{9, 4, 8\}$



iv. $A \backslash C = \{-3, 3, 5, -1, 0, -2\} \backslash \{3, 9, 4, 8\} = \{-3, 5, -1, 0, -2\}$



(**3**) **i**. $G = \{3, 2\}$

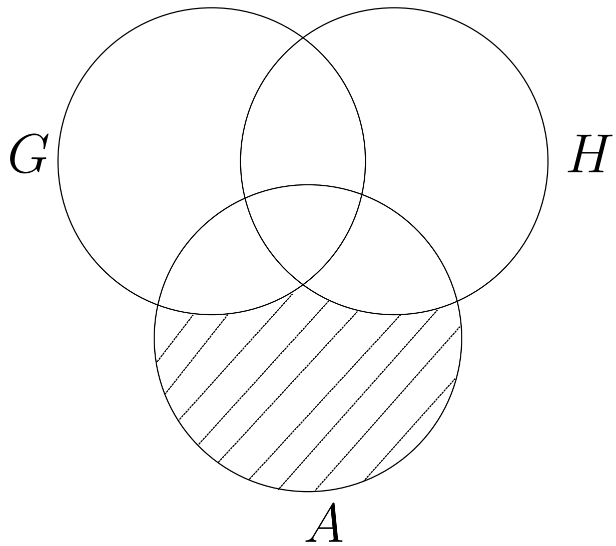
ii. $G \cup H = \{3, 2\} \cup \{3, 5, 7, 9, 4, -2, 6\} = \{3, 5, 7, 2, 9, -2, 4, 6\}$

iii. $A \cap H = \{-3, -1, 2, 0, 9, -2, 8, 6, 1\} \cap \{3, 5, 7, 9, 4, -2, 6\} = \{9, -2, 6\}$

iv. $A \backslash H = \{-3, -1, 2, 0, 9, -2, 8, 6, 1\} \backslash \{3, 5, 7, 9, 4, -2, 6\} = \{-3, -1, 2, 0, 8, 1\}$

v.

$$\begin{aligned} A\setminus(G\cup H) &= \{-3,-1,2,0,9,-2,8,6,1\}\setminus(\{3,2\}\cup\{3,5,7,9,4,-2,6\}) \\ &= \{-3,-1,2,0,9,-2,8,6,1\}\setminus\{3,5,7,2,9,-2,4,6\} \\ &= \{-3,-1,0,8,1\} \end{aligned}$$



vi.

$$\begin{aligned} (A\setminus H)\setminus G &= (\{-3,-1,2,0,9,-2,8,6,1\}\setminus\{3,5,7,9,4,-2,6\})\setminus\{3,2\} \\ &= \{-3,-1,2,0,8,1\}\setminus\{3,2\} \\ &= \{-3,-1,0,8,1\} \end{aligned}$$

vii.

$$\begin{aligned} G\setminus(A\setminus H) &= \{3,2\}\setminus(\{-3,-1,2,0,9,-2,8,6,1\}\setminus\{3,5,7,9,4,-2,6\}) \\ &= \{3,2\}\setminus\{-3,-1,2,0,8,1\} \\ &= \{3\} \end{aligned}$$

viii. $H\cup\emptyset = \{3,5,7,9,-2,4,6\}\cup\emptyset = \{3,5,7,9,-2,4,6\}$

ix.

$$\begin{aligned} (\emptyset\cup H)\cup(G\cup A) &= (\emptyset\cup\{3,5,7,9,-2,4,6\})\cup(\{3,2\}\cup\{-3,-1,2,0,9,-2,8,1,6\}) \\ &= \{3,5,7,9,4,-2,6\}\cup\{3,-3,-1,2,0,9,-2,8,6,1\} \\ &= \{3,-1,7,2,0,-2,1,6,-3,5,9,4,8\} \end{aligned}$$

(4) **i.** $Prob\,(r_1 \text{ is odd}) = \dfrac{3}{5}$

ii. $Prob\,(r_1 = 9) = \dfrac{1}{5}$

iii. $Prob\,(r_1 \geq 6) = \dfrac{4}{5}$

iv. $Prob\,(r_1 \text{ is odd and } r_1 \geq 6) = \dfrac{2}{5}$

v. $Prob\,(r_1 \text{ is odd or } r_1 \geq 6) = \dfrac{5}{5} = 1$

vi. $Prob\,(r_1 \text{ is odd given that } r_1 \geq 6) = \dfrac{2}{4} = \dfrac{1}{2}$

vii. $Prob\,(r_1 \text{ is odd}) = \dfrac{3}{5}$, and $Prob\,(r_2 \text{ is odd}) = \dfrac{2}{4} = \dfrac{1}{2}$.

Now r_1 and r_2 are chosen independently,

so $Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd }) = Prob\,(r_1 \text{ is odd}) \times Prob\,(r_2 \text{ is odd})$.

Hence $Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd }) = \dfrac{3}{5} \times \dfrac{1}{2} = \dfrac{3}{10}$

viii. By the principle of inclusion\exclusion,

$Prob\,(r_1 \text{ is odd } \textbf{or } r_2 \text{ is odd}) = Prob\,(r_1 \text{ is odd}) + Prob\,(r_2 \text{ is odd}) - Prob\,(\text{both } r_1 \text{ and } r_2 \text{ are odd })$.

Hence $Prob\,(r_1 \text{ is odd } \textbf{or } r_2 \text{ is odd}) = \dfrac{3}{5} + \dfrac{1}{2} - \dfrac{3}{10} = \dfrac{4}{5}$

ix. Now r_1 and r_2 are chosen independently, so

$Prob\,(r_1 \text{ is odd } \textbf{given that } r_2 \text{ is even }) = Prob\,(r_1 \text{ is odd})$.

Hence $Prob\,(r_1 \text{ is odd } \textbf{given that } r_2 \text{ is even }) = \dfrac{3}{5}$