

(1) $\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ \hline 1 & 2 & 2 & 2 & 2 & 2 & 1 \\ \hline \frac{1}{12} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{12} \\ \hline \end{array}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline \cancel{1} & 2 & 3 & 4 & 5 & 6 & 7 \\ \hline 1 & 2 & 2 & 2 & 2 & 1 & \\ \hline \frac{1}{10} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{10} & \\ \hline \end{array}$

左図より 1→3の確率は $\frac{1}{12} \cdot \frac{1}{5} = \frac{1}{60}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & \cancel{3} & 4 & 5 & 6 & 7 \\ \hline 1 & 1 & 1 & 2 & 2 & 1 & \\ \hline \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{4} & \frac{1}{4} & \frac{1}{8} & \\ \hline \end{array}$

左図より 3→1の確率は $\frac{1}{6} \cdot \frac{1}{8} = \frac{1}{48}$

よって 求めた確率は $\frac{1}{60} + \frac{1}{48} = \frac{1}{12} \left(\frac{1}{5} + \frac{1}{4} \right) = \frac{1}{12} \cdot \frac{4+5}{20} = \frac{3}{80}$

(2) $\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ \hline 1 & 2 & 2 & 2 & 2 & 2 & 1 \\ \hline \frac{1}{12} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{12} \\ \hline \end{array}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & \cancel{2} & 3 & 4 & 5 & 6 & 7 \\ \hline 1 & 1 & 2 & 2 & 2 & 1 & \\ \hline \frac{1}{9} & \frac{1}{9} & \frac{2}{9} & \frac{2}{9} & \frac{2}{9} & \frac{1}{9} & \\ \hline \end{array}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & \cancel{2} & \cancel{3} & 4 & 5 & 6 & 7 \\ \hline 1 & 1 & 1 & 2 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 2→4→6の確率は

$\frac{1}{36} \cdot \frac{2}{9} \cdot \frac{1}{3} = \frac{1}{81}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & \cancel{2} & 3 & 4 & 5 & \cancel{6} & 7 \\ \hline 1 & 1 & 2 & 1 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 2→6→4の確率は

$\frac{1}{36} \cdot \frac{2}{9} \cdot \frac{1}{3} = \frac{1}{81}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & \cancel{4} & 5 & 6 & 7 \\ \hline 1 & 2 & 1 & 1 & 2 & 1 & \\ \hline \frac{1}{8} & \frac{1}{4} & \frac{1}{8} & \frac{1}{8} & \frac{1}{4} & \frac{1}{8} & \\ \hline \end{array}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & \cancel{2} & 3 & \cancel{4} & 5 & 6 & 7 \\ \hline 1 & 1 & 1 & 2 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 4→2→6の確率は

$\frac{1}{6} \cdot \frac{1}{4} \cdot \frac{1}{3} = \frac{1}{72}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & \cancel{4} & 5 & \cancel{6} & 7 \\ \hline 1 & 2 & 1 & 1 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 4→6→2の確率は

$\frac{1}{6} \cdot \frac{1}{4} \cdot \frac{1}{3} = \frac{1}{72}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & 4 & 5 & \cancel{6} & 7 \\ \hline 1 & 2 & 2 & 2 & 1 & 1 & \\ \hline \frac{1}{9} & \frac{2}{9} & \frac{2}{9} & \frac{2}{9} & \frac{1}{9} & \frac{1}{9} & \\ \hline \end{array}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & \cancel{2} & 3 & 4 & 5 & \cancel{6} & 7 \\ \hline 1 & 1 & 2 & 1 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 6→2→4の確率は

$\frac{1}{36} \cdot \frac{2}{9} \cdot \frac{1}{3} = \frac{1}{81}$

$\begin{array}{|c|c|c|c|c|c|c|} \hline 1 & 2 & 3 & \cancel{4} & 5 & \cancel{6} & 7 \\ \hline 1 & 2 & 1 & 1 & 1 & 1 & \\ \hline \frac{1}{6} & \frac{1}{3} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \frac{1}{6} & \\ \hline \end{array}$

左図より 6→4→2の確率は

$\frac{1}{36} \cdot \frac{2}{9} \cdot \frac{1}{3} = \frac{1}{81}$

よって 求めた確率は $\frac{4}{81} + \frac{1}{36} = \frac{1}{9} \left(\frac{4}{9} + \frac{1}{4} \right) = \frac{1}{9} \cdot \frac{16+9}{36} = \frac{25}{324}$

$\frac{25}{324}$