

6.17

$$\begin{aligned}
1) \quad \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} &= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} - \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \\
&= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} - \left(\left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} - \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \right) \\
&= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} - \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} + \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \\
&= \lambda(\lambda-1)(\lambda-2)(\lambda^2-2\lambda+2) - \lambda(\lambda-1)^3 + \lambda(\lambda-1)^2 \\
&= \lambda(\lambda-1) \left((\lambda-2)(\lambda^2-2\lambda+2) - \underbrace{(\lambda-1)^2 + (\lambda-1)}_{-(\lambda-1)((\lambda-1)-1)} \right) \\
&= \lambda(\lambda-1)(\lambda-2) \left((\lambda^2-2\lambda+2) - (\lambda-1) \right) \\
&= \lambda(\lambda-1)(\lambda-2)(\lambda^2-3\lambda+3)
\end{aligned}$$

$$\begin{aligned}
2) \quad \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} &= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \\
&= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} + \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \\
&= \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} + \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} + \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} + \left\{ \begin{array}{c} \bullet \\ \diagup \quad \diagdown \\ \bullet \quad \bullet \\ \diagdown \quad \diagup \\ \bullet \end{array} \right\} \\
&= \lambda(\lambda-1)(\lambda-2)(\lambda-3)(\lambda-4) + \lambda(\lambda-1)(\lambda-2)(\lambda-3) \\
&\quad + \lambda(\lambda-1)(\lambda-2)(\lambda-3) + \lambda(\lambda-1)(\lambda-2) \\
&= \lambda(\lambda-1)(\lambda-2) \left((\lambda-3)(\lambda-4) + (\lambda-3) + (\lambda-3) + 1 \right) \\
&= \lambda(\lambda-1)(\lambda-2)(\lambda^2-5\lambda+7)
\end{aligned}$$