

$$\begin{array}{c}
\frac{\overline{\vdash \textcolor{red}{p}^\perp \Downarrow [\cdot][1 : p] \cdot; \cdot}^I}{\vdash [\cdot][1 : p] \cdot; \cdot //^1 \vdash [\cdot][\cdot] p^\perp; \cdot}^4 \\
\vdash [\cdot][1 : p] \cdot; \cdot //^1 \vdash [\cdot][\cdot] \cdot; p^\perp \quad * \\
\vdash \textcolor{red}{!}^1 p^\perp \Downarrow [\cdot][1 : p] \cdot; \cdot \quad ! \\
\\
\frac{\overline{\vdash \textcolor{red}{q}^\perp \Downarrow [\cdot][2 : q] \cdot; \cdot}^I}{\vdash [\cdot][2 : q] \cdot; \cdot //^2 \vdash [\cdot][\cdot] q^\perp; \cdot}^4 \\
\vdash [\cdot][2 : q] \cdot; \cdot //^2 \vdash [\cdot][\cdot] \cdot; q^\perp \quad * \\
\vdash \textcolor{red}{!}^2 q^\perp \Downarrow [\cdot][2 : q] \cdot; \cdot \quad ! \\
\\
\frac{\overline{\vdash \textcolor{red}{r}^\perp \Downarrow [\cdot][3 : r] \cdot; \cdot}^I}{\vdash [\cdot][3 : r] \cdot; \cdot //^3 \vdash [\cdot][\cdot] r^\perp; \cdot}^4 \\
\vdash [\cdot][3 : r] \cdot; \cdot //^3 \vdash [\cdot][\cdot] \cdot; r^\perp \quad * \\
\vdash \textcolor{red}{!}^3 r^\perp \Downarrow [\cdot][3 : r] \cdot; \cdot \quad ! \\
\vdash \textcolor{red}{!}^3 r^\perp \otimes \mathbf{1} \Downarrow [\cdot][3 : r] \cdot; \cdot \quad \otimes \\
\vdash \mathbf{1} \Downarrow [\cdot][\cdot] \cdot; \cdot \quad \mathbf{1} \\
\vdash \textcolor{red}{!}^3 r^\perp \otimes \mathbf{1} \Downarrow [\cdot][3 : r] \cdot; \cdot \quad \otimes \\
\\
\vdash \textcolor{red}{!}^2 q^\perp \otimes \textcolor{red}{!}^3 r^\perp \otimes \mathbf{1} \Downarrow [\cdot][2 : q, 3 : r] \cdot; \cdot \quad \otimes \\
\\
\frac{\vdash \textcolor{red}{!}^1 p^\perp \otimes \textcolor{red}{!}^2 q^\perp \otimes \textcolor{red}{!}^3 r^\perp \otimes \mathbf{1} \Downarrow [\cdot][1 : p, 2 : q, 3 : r] \cdot; \cdot}{\vdash [\cdot][\cdot] \cdot; \textcolor{red}{!}^1 p^\perp \otimes \textcolor{red}{!}^2 q^\perp \otimes \textcolor{red}{!}^3 r^\perp \otimes \mathbf{1}, ?^1 p, ?^2 q, ?^3 r}^*
\end{array}$$