

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