$$
\begin{aligned}
(g \fatsemi \mathrm{Tr}^Z_{X,Z}(f))^\star(x') &= \bigcup_{x \in g^\star(x')} \mathrm{Tr}^Z_{X,Z}(f)^\star(x) \\
&= \bigcup_{x \in g^\star(x')} \left\{ y \in Y \mid \bigvee_{z \in Z} \langle y, z \rangle \in f^\star(x, z) \right\} \\
&= \left\{ y \in Y \mid \bigvee_{z \in Z} \langle y, z \rangle \in \bigcup_{x \in g^\star(x')} f^\star(x, z) \right\}.
\end{aligned}
$$