$$
\begin{aligned}
E_{\mathbf{v},\mathbf{w}}[\forall x.f(x)] &= E_{\mathbf{v},\mathbf{w}}[f(X_1)\wedge \ldots \wedge f(X_n)] \\
&= E_{\mathbf{v},\mathbf{w}}[f(X_1)]\times \ldots \times E_{\mathbf{v},\mathbf{w}}[f(X_n)]
\end{aligned}
$$