

$$\begin{aligned}
\mathbb{E}_{p(x|y)}[f(x)] &= \int f(x)p(x|y)\mathrm{d}x \\
&= \int f(x)p(x|y)\frac{q(x)}{q(x)}\mathrm{d}x \\
&= \mathbb{E}_{q(x)}\left[f(x)\frac{p(x|y)}{q(x)}\right]
\end{aligned}$$