

1.33

$$\begin{aligned}
H[y|x] = 0 &\implies - \sum_y \sum_x p(y, x) \ln(p(y|x)) = 0 \\
&\implies - \sum_y \sum_x p(y|x) p(x) \ln(p(y|x)) = 0
\end{aligned}$$

Since probabilities are all either positive or 0, for all x such that $p(x) > 0$, either $p(y|x) = 0$ or $\ln(p(y|x)) = 0 \implies p(y|x) = 1$.

But if given a nonzero x , $p(y|x) = 1$ for some y , then for all other values of y , $p(y|x) = 0$ as the probabilities sum up to 1.

Therefore, for each x there is only one value of y such that $p(y|x) \neq 0$.