$$
\begin{aligned}
\overbrace{p(x_k|Z_k)}^{\text{posterior}} &= \frac{p(x_k, Z_k)}{p(Z_k)} \\
&= \frac{p(x_k, z_k, Z_{k-1})}{p(z_k, Z_{k-1})} \\
&= \frac{p(z_k|x_k, Z_{k-1})\, p(x_k, Z_{k-1})}{p(z_k|Z_{k-1})\, p(Z_{k-1})} \\
&= \frac{p(z_k|x_k)\, p(x_k|Z_{k-1})\, p(Z_{k-1})}{p(z_k|Z_{k-1})\, p(Z_{k-1})} \\
&= \frac{\overbrace{p(z_k|x_k)}^{\text{likelihood}}\, \overbrace{p(x_k|Z_{k-1})}^{\text{prior (prediction)}}}{\int p(z_k|x_k)\, p(x_k|Z_{k-1})\, dx_k}
\end{aligned}
$$