\[
\int e^{-\frac{x^2}{2}} \left( \frac{e^{x}}{x} \right)^\alpha dx = \frac{1}{\alpha} e^{-\frac{x^2}{2}} \left( \frac{e^{x}}{x} \right)^\alpha \text{ for } \alpha \neq 0
\]

Now all that's left to do is the integrals. This can be done, but a trick is simpler: write \( \cos \frac{1}{\sqrt{2}} \) in exponential form. 

Dropping the \( \frac{e^{x}}{x} \) multiplicity, the \( \alpha \) does not appear.