Present (unhappy) state:

\[
\int \omega(x+y)e^{x+y}\phi(x)\psi(y) = \langle \omega(x+y), e^{x+y}\phi(x)\psi(y) \rangle
\]

\[
= \langle V\omega(x+y), V\overline{e^{x+y}}\phi(x)\psi(y) \rangle = \langle \omega(x)\omega(y), e^x e^y V\phi(x)\psi(y) \rangle
\]

\[
= \langle \omega(x)\omega(y), e^x e^y \phi(x)\psi(y) \rangle = \int \omega(x)\omega(y)e^x e^y \phi(x)\psi(y)
\]

Relies on: \( V\omega(x+y) = \omega(x)\omega(y) \)

\[ \sqrt{V} = 1 \]

\[ \sqrt{V} = \text{not happy} \]

\[ \sqrt{V} = \text{together} \]

Now assume only \( V\omega^{1/2}(x+y) = \omega^{1/2}(x)\omega^{1/2}(y) \)

\[
\int \omega(x+y)e^{x+y}\phi(x)\psi(y) = \langle \omega^{1/2}(x+y), e^{x+y} \omega^{1/2}(x+y) \phi(x)\psi(y) \rangle
\]

\[
= \langle \sqrt{V}\omega^{1/2}(x+y), \sqrt{V}\omega^{1/2}(x+y) \phi(x)\psi(y) \rangle
\]

\[
= \langle \omega^{1/2}(x)\omega^{1/2}(y), e^x e^y \omega^{1/2}(x)\omega^{1/2}(y) \phi(x)\psi(y) \rangle
\]

\[
= \langle \omega^{1/2}(x)\omega^{1/2}(y), e^x e^y \omega^{1/2}(x)\omega^{1/2}(y) \phi(x)\psi(y) \rangle
\]

\[
= \int \omega(x)\omega(y)e^x e^y \phi(x)\psi(y)
\]